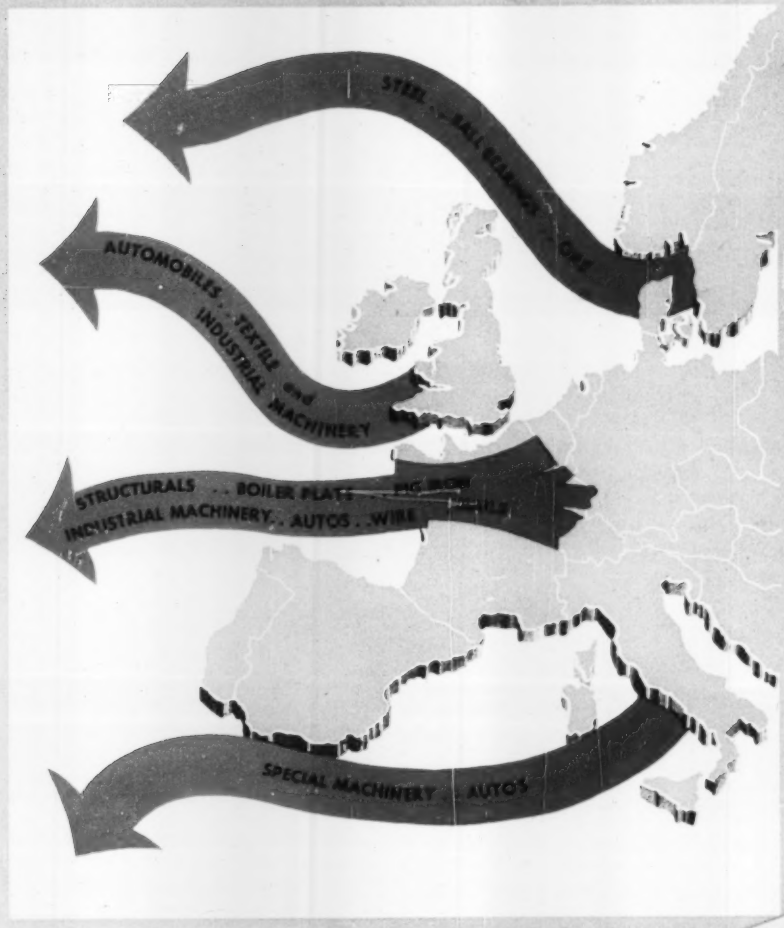
DECEMBER 31, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING


STEEL . . BALL BEARINGS . . OPT
AUTOMOBILES . . TEXTILE and INDUSTRIAL MACHINERY
STRUCTURALS . . BOILER PLATE
INDUSTRIAL MACHINERY . . AUTOS . . WIRE
SPECIAL MACHINERY . . AUTO'S

Recovery, Rearmament Shift Trade Winds for Europe

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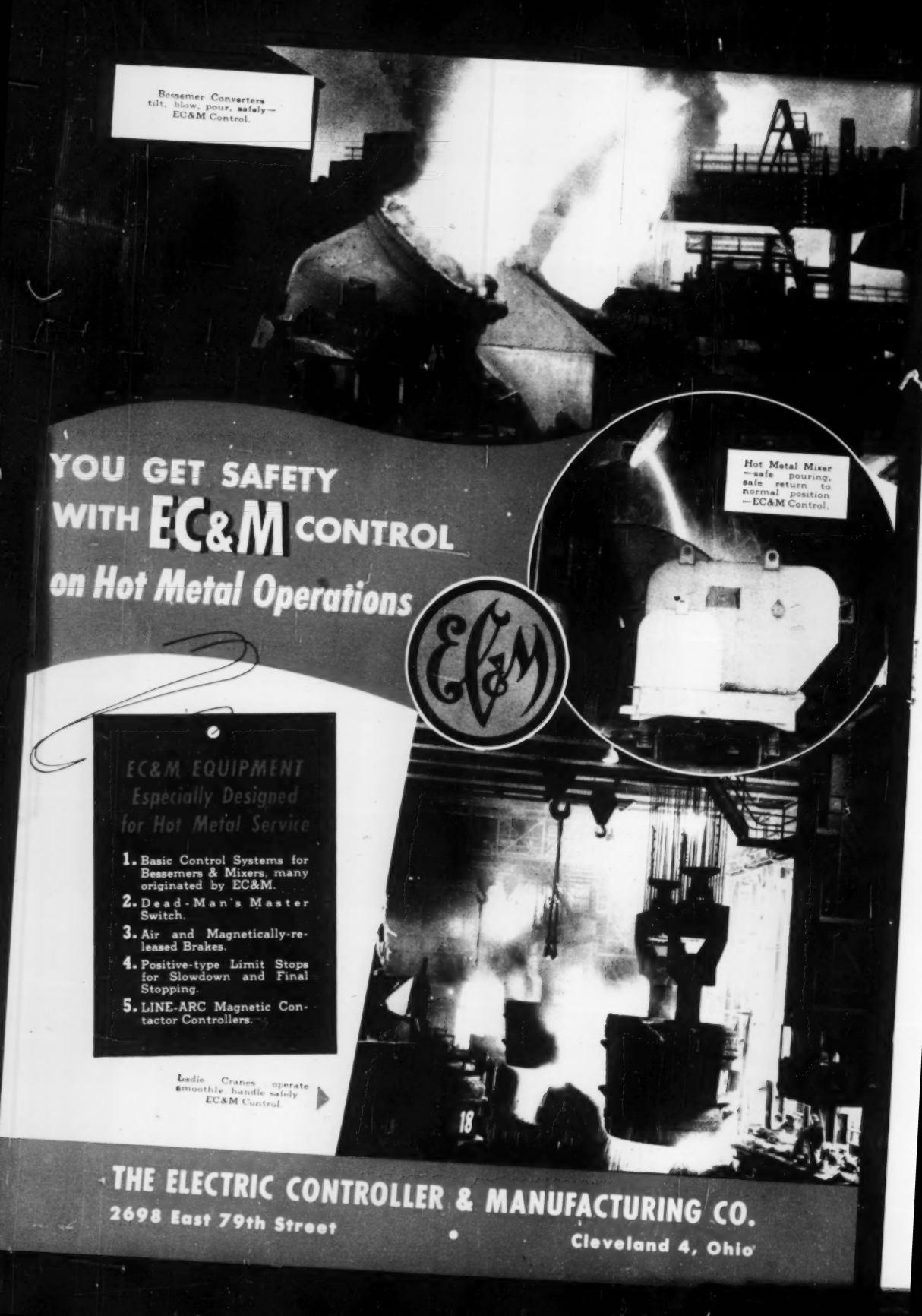
Bessemer Converters tilt, blow, pour, safely—EC&M Control.
YOU GET SAFETY WITH EC&M CONTROL on Hot Metal Operations
Hot Metal Mixer—safe pouring, safe return to normal position—EC&M Control.
EC&M EQUIPMENT Especially Designed for Hot Metal Service
1. Basic Control Systems for Bessemers & Mixers, many originated by EC&M.
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3. Air and Magnetically-released Brakes.
4. Positive-type Limit Stops for Slowdown and Final Stopping.
5. LINE-ARC Magnetic Contactor Controllers.
Ladle Cranes operate smoothly, handle safely EC&M Control.
18
THE ELECTRIC CONTROLLER & MANUFACTURING CO.
2698 East 79th Street
Cleveland 4, Ohio

New Balanced-Alloy Steels

80B00
TS8100
81B00
TS8600
TS94B00
4100 INT

The new series of balanced-alloy steels recently approved by the American Iron and Steel Institute are now being made by Bethlehem.

They are designed primarily to save nickel and molybdenum that are urgently needed for certain defense applications.

The new balanced-alloy steels are being used to replace some of the older and better known alloy grades such as: 2300 Nickel, 3100 Nickel-Chromium, 4100 Chromium-Molybdenum, 4600 Nickel-Molybdenum, 8600 and 8700 Nickel-Chromium-Molybdenum steels.

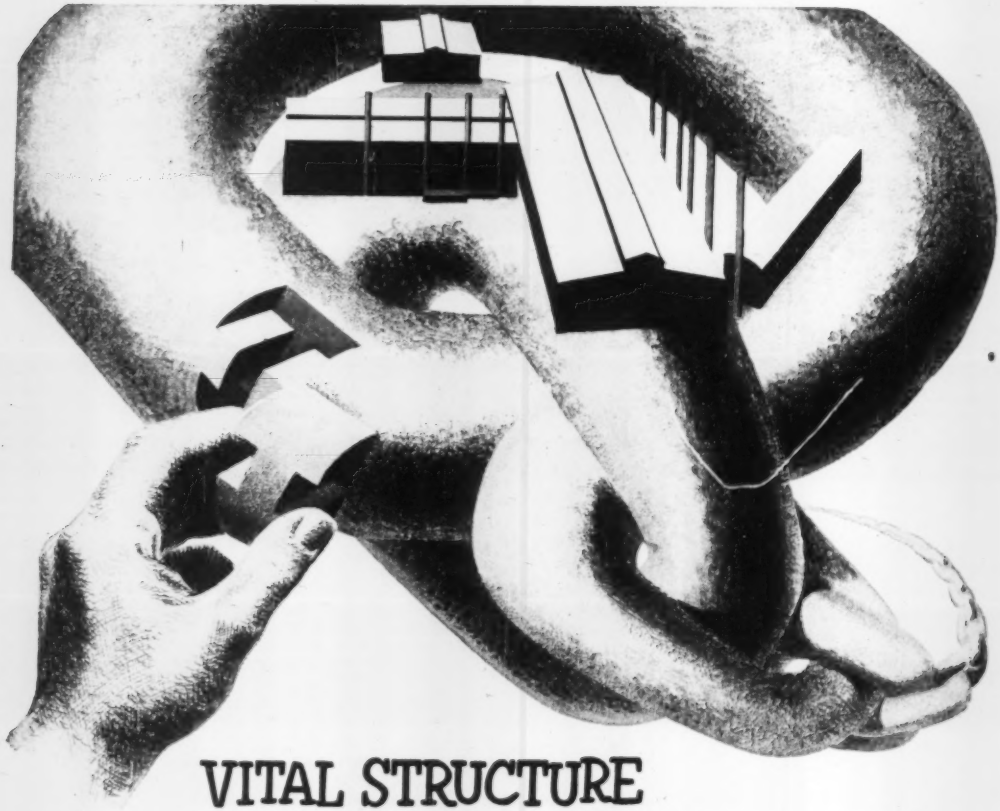
If you have any problems concerning the use of the new balanced-alloy steels, or if you need information on the selection, treatment and machining of steels for defense work, our metallurgists will be glad to help. Phone or write for this service.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL



VITAL STRUCTURE

in Barium's chain of steel service to industry

Making structural shapes is a vital activity in a chain of companies that form a single complete source of steel supply.

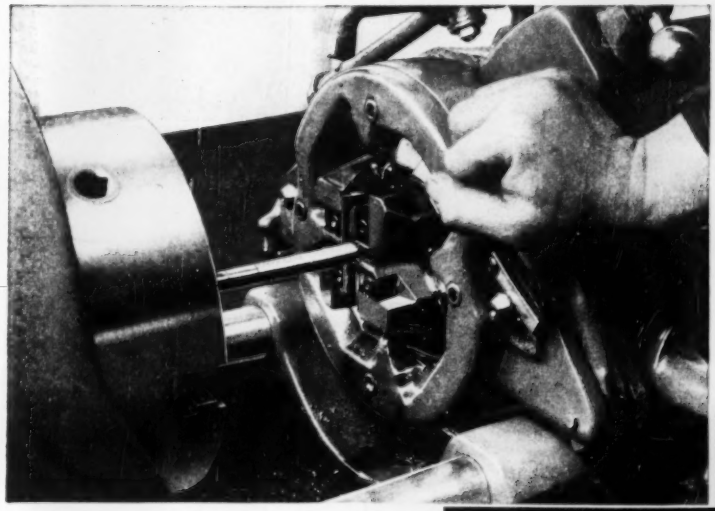
The companies are Barium subsidiaries. The maker of structural shapes is Barium's Phoenix Iron & Steel Company, also producing angles, beams, channels, and, through their subsidiary, Phoenix Bridge Company, constructing and engineering bridges, buildings, and other fabrications from structural steel and plate.

Phoenix is one of fifteen strategically located Barium subsidiaries controlling quality from blast furnace to end product, ready to work closely together (as a self-contained unit, if need be) to solve your steel problems.

Call on Barium without obligation for unbiased advice, whatever your steel need . . . plate, structurals, fabrications, forgings, stampings, springs, bolts, nuts. Contact Barium at 25 Broad Street, New York City.

BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL CO. CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC. CUYAHOGA SPRING CO. • ERIE BOLT AND NUT CO. GEOMETRIC STAMPING CO. • GLOBE FORGE, INC. INDUSTRIAL FORGE AND STEEL, INC. • JACOBS AIRCRAFT ENGINE CORPORATION • KERMATH MFG. CO. • KERMATH LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON AND STEEL CO. • WILEY MANUFACTURING CO.

Little Landis
PIPE THREADING & CUTTING MACHINE

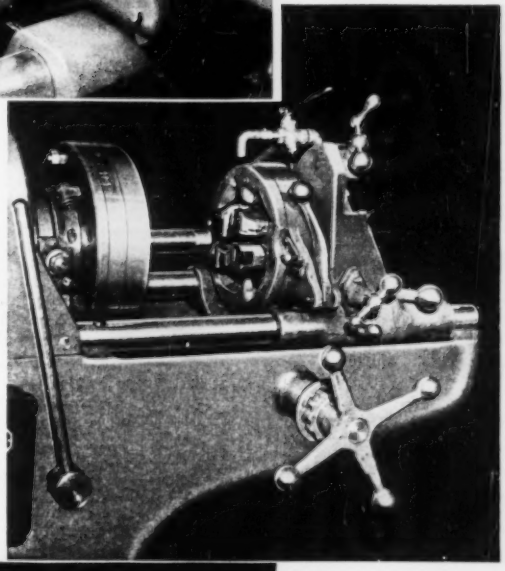


FOR

Maintenance

AND

Jobbing



● The LITTLE LANDIS Pipe Threading and Cutting Machine is designed for threading bolts and for cutting off and threading pipe in jobbing and maintenance shops. In the illustrations on this page, the 2" LITTLE LANDIS is producing bolt threads for use in maintenance work.

The LITTLE LANDIS can handle a variety of work at a minimum cost, permit the quickest possible set-up changes, and produce cleanly-cut and well-formed threads on all materials. It uses the Landis Chaser, the only pipe threading die with the same free-cutting action and natural clearance of a lathe tool. This allows for long life between chaser grindings and smooth finish and accuracy in the finished thread.

Write for Bulletin C-82

LANDIS MACHINE CO.

WAYNESBORO, PA., U.S.A.

MAKE YOUR STEEL DOLLARS STRETCH

if you build or own

equipment like this . . . . . .

Here's what J&L Otiscoloy, the Transportation Steel, can provide

INCREASED PAYLOAD—Otiscoloy's high tensile strength permits the use of lighter sections without loss of strength — cuts equipment deadweight which allows for greater profit-paying cargo.

LOWER COSTS—Lighter sections with equivalent strength frequently make possible the production of 1/3 more units per ton compared with mild steel — result in 1/3 lower freight cost per unit — 1/3 less weight handled during production.

CORROSION RESISTANCE—Otiscoloy has 4 to 6 times greater resistance to atmospheric corrosion than mild steel — helps lengthen equipment service life — cut maintenance costs.

FATIGUE RESISTANCE—Otiscoloy has high resistance to fatigue — considerably greater than that of mild steel.

WORKABILITY—Otiscoloy can be easily welded or cold formed by any standard method.

J&L STEEL

It's no surprise builders and users of transportation equipment are turning to high-tensile J&L Otiscoloy to give them machines that require minimum maintenance — help increase income through reduced deadweight and greater payloads.

When you're looking for new ways to cut costs on your equipment, you'll also find it well worth your while to check further into the advantages of J&L Otiscoloy, the modern transportation steel. Why not write us for additional information *today?*

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

STEEL
The Weekly Magazine of Metalworking
VOL. 129 NO. 27 DECEMBER 31, 1951

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Next Week ... **YEARBOOK OF INDUSTRY ISSUE** ... **Metalworking's Destiny** ... **STEEL Listens In** ... **Facts and Figures on Metalworking** ... **1952 Annual Forum on Technical Progress**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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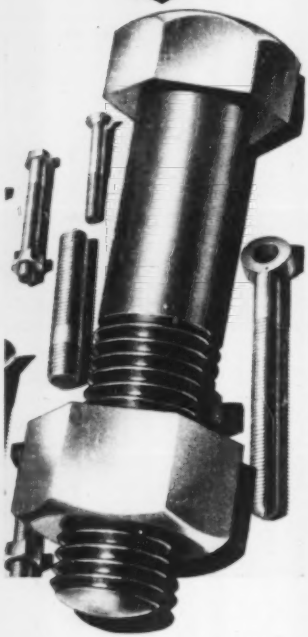
BOLTS
NUTS
STUDS



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Behind the Scenes...

Good Currency

STEEL's annual issues certainly have extended currency. Herbert A. Newbury, P.O. Box 477, Talladega, Ala., reports that he still has copies of the 1942, 1943, 1946 and 1947 yearbook issues. He's finished with them now, since the 1952 issue comes out one week from today. If you're interested in any of the copies he has, just write him. They're yours for the cost of postage.

For a while, we never thought the editors would make it in getting out next week's special issue, but they came through, as always. Parts of it are still to be printed, but nearly everything but the market section has now been written. The finished product will be on your desk next Monday morning. Don't miss it.

Wise Men

Two pioneers in artificial rainmaking were speakers at the American Chemical Society's symposium at Northwestern University last Thursday and Friday. We've come around in circles since the early days of Indians. Hundreds of years ago, the Indian rainmaker was one of the wise men of that society. Now the rainmakers speak at learned symposiums.

But neither the Indians nor today's scientific rain men appear to have the answer to a vital aspect of the rain question—how to stop it once it's started. We've been staring out our window for three hours now, watching the snow pile up (we're assuming that an all-around rain man can handle snow, too). We'd like the snowfall to stop, for our car is stuck in a drift, our wife can't get out of the house so we have to do the shopping and the ice is backing up under the eaves of our house and we have three leaks.

Back to Crystal Set

Alas and alack, *Retailing Daily* calculates that the average TV set requires five service calls a year. The nation's television service bill is $650 million a year, exclusive of antenna installations. We're going to turn our model in and go back to our old crystal set.

Explanation

As we feared, there's a simple explanation as to how someone figured out the weight of George Washington's pencilled signature, a problem we discussed Dec. 10. The first of many people to write in setting us straight was W. M. Wilkinson. "Someone could have weighed a comparable piece of paper and then copied George's signature with a comparable type of pencil, then weighed the sum total."

Mr. Wilkinson, who is with the Navy's Bureau of Ships in Washington, says "reading your magazine is very helpful in my official duties, and I didn't take more than a very few minutes of the taxpayers' time to figure the signature matter out and jot down the world-shaking explanation."

Wordy

Those long words are still coming in, but we're getting into foreign languages now. Theodore Kain of St. Paul, says he considers that legitimate because most of the chemical words we have been listing are mostly Greek. He suggests this 66-letter job which is the German word for U-boat—unterseeboottorpedoverstoervernichterindentgrundbohrerkaputmacher.

John Howe Hall of Swarthmore, Pa., says most of the chemical words ought to be disbarred because they are just "polyglots with all the meaning removed."

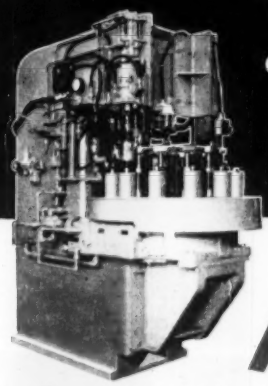
Puzzle Corner

The answer to the Dec. 17 excursion into metaphysical mathematics is: If one-third of 6 were 3, 6 would be 9, 20 would be 30 and one-fourth of 30 is $7\frac{1}{2}$. First in with that answer was Harry Ruff of Service Iron & Steel Co.

A farmer divides a bin of potatoes among his four sons and five grandsons, as follows: 1. Farmer takes one-fifth of the potatoes for himself, and finds one left over, which is given to the pigs. 2. The first son gets one fifth of the remainder, and one potato is left over for the pigs. 3. The second, third, and fourth sons, each in turn, take one fifth of the remainders, and after each division have one left over for the pigs. 4. When the sons have had their shares, the remainder is divided equally among the five grandsons, and one potato is left over for the pigs. How many potatoes were there originally, assuming that the number is the smallest which will fulfill the conditions?

Shrdlu

(Metalworking Outlook—Page 13)



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MULTIPRESS®

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The fast, flexible, oil-hydraulic *power-control* of Multipress makes it quickly adaptable to the widest range of ordnance work —as typified by the list at right. Built in eight basic frame sizes, in capacities of 1 to 50 ton, and with choice of ram control—*plus design that lends to tooling of widest variety*—Multipress can be delivered and on your production line in the shortest possible time. Doing the job faster, better and at less cost! And it gives you a standard production machine that is always easily reconverted to civilian production at any time. Write today for details on Multipress and our facilities for helping you solve your ordnance production problems.

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Typical Production Operations performed on this Ordnance Work

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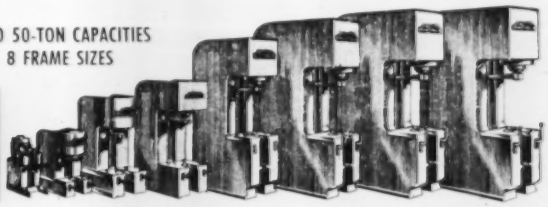
MARKING	PRESS FIT ASSEMBLY	BLANKING
STAKING	CRIMPING	DRAWING
SWAGING	FORMING	TRIMMING
PIERCING	FLARING	PREFORMING
ASSEMBLY	CLINCHING	TESTING (HYDROSTATIC)
COMPACTION	RIVETING	STAMPING
LOADING	NECKING DOWN	CLAMPING

1 TO 50-TON CAPACITIES
8 FRAME SIZES



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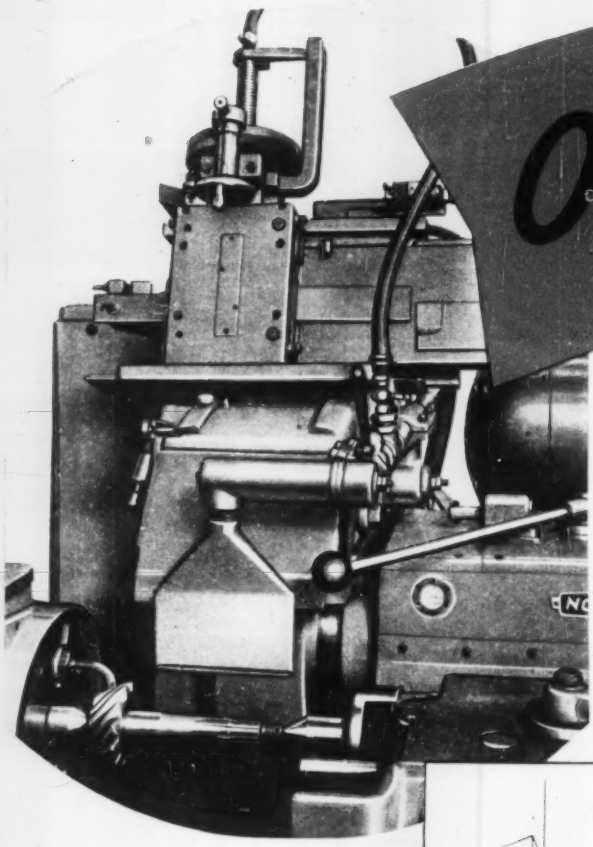

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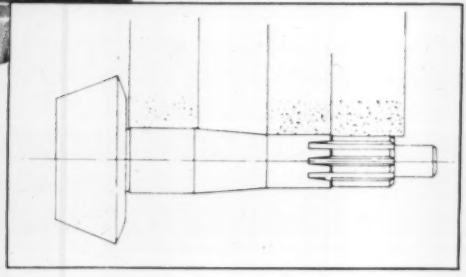

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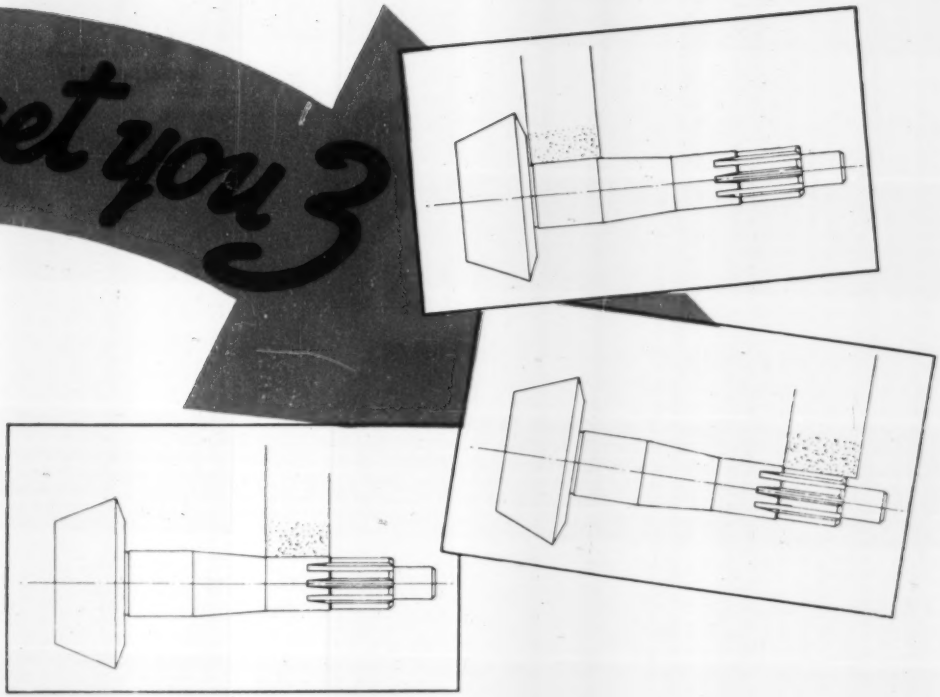

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Replaces 3 Machines . . . 3 Operations
Increases Production 128%

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The Recommendation: Norton engineers suggested replacing the three old-type machines with one new Norton 10" Type CTU Semiautomatic Grinder with multi-wheel mount and automatic truing device — wheel guard type.

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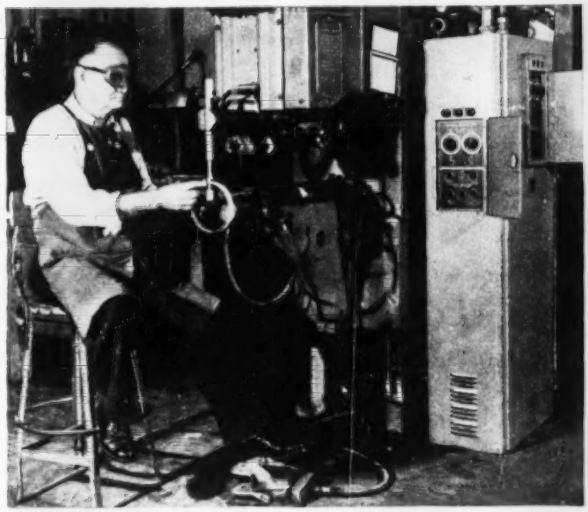
Solar Aircraft Welds Close to the Edge



Material does not split out, spattering is reduced on this jet engine part because G-E slope control permits a gradual increase in welding current that also reduces tip pick-up and spatter. More welds can be made before electrodes must be cleaned. Welds are sound and uniform. Bulletin GEC-534.

G-E Slope Control for Resistance Welding Prevents Split-outs on Stainless Steel Jet Engine Parts

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PREVENT CURRENT VARIATIONS **Where the insertion of magnetic material in the throat of the welding machine causes weld variations, the current-regulating compensator keeps current constant to within plus or minus two percent. Bulletin GEA-4207.**

GENERAL ELECTRIC

645-54

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He surveys your production operations and your available equipment.

•

He considers work material properties and desired finishes and tolerances.

•

He plots proper machine feed, speed and method of tool driving.

•

then . . . he develops practical design and engineering specifications for a special cutting tool, metallurgically "tailor-made" for your application.

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LETTERS
TO THE EDITORS

Confusing, Not Amusing

Read your article on the Capehart Amendment pricing formula (Dec. 17, p. 61)—I believe the article covered this situation very well from the standpoint of business people. We have found a few instances where the Capehart Amendment has been helpful in supporting price increases over base period prices. In the main, however, many companies are trying to support their general ceiling prices, frozen as of Jan. 26, 1951.

There is no doubt that CPR 22, 30 and the Capehart Amendment have caused an unusual amount of clerical effort and some confusion in manufacturing concerns.

O. F. Ortle, assistant manager
Ernst & Ernst
Cleveland

Roller Coaster Temperatures

Your article on "Hot Sprayed Lacquer" (Nov. 12, p. 76) is timely, interesting. Would you please explain how the mixture is 75°-79° F two inches from the gun, drops to 68° F at five inches, and rises again to 73° F at eight inches from the gun?

John Enos, plant engineer
Colonial Engineering Co. Inc.
W. Somerville, Mass.

• *Reason for the lowest temperature being recorded at five inches is at that point the solvent evaporation is completed. In the next three inches of travel the material picks up heat from the surrounding atmosphere. Whether there is an override of 1 degree above room temperature or whether this is an error in recording we can't say for certain. For further information on this process, write H. C. Simmons, Hercules Powder Co., Boston.*

Edits For Distribution

I would like to obtain a few hundred copies of Mr. Shaner's editorial ("Camel Under the Tent", Oct. 29, p. 31) to distribute among acquaintances and organizations.

Cooley Butler
Los Angeles

• *The cost of 100 copies is $7.00, with each additional 100, if ordered at the same time, costing 7*5c.

Future Investment?

We would like to use your article "Pushbutton Plant" (Dec. 3, p. 82) as a condensation in *Investor's Future.*

R. F. Laycock
Investor's Future Inc.
Crystal Lake, Ill.

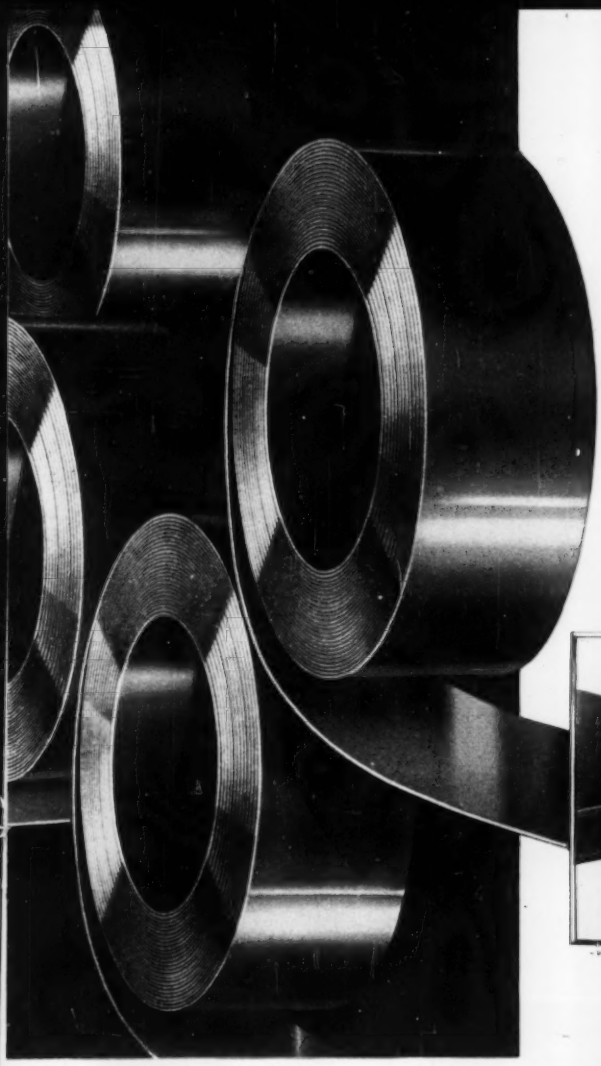
• *Permission granted.*

Information Please

How may I obtain copies of John S. Morgan's article "Quality Control—It Works in Small Plants Too" (July 16, p. 74).

Laura White
A. T. Kearney & Co.
Chicago

• *They're on the way.*



where copper's face value counts and steel's strength and economy are needed . . .

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SuVeneer Clad Metal gives you copper bonded inseparably to plain steel strip, on one or both sides . . . providing the advantages of all-copper surfaces, while saving solid copper for defense needs. Your costs are lower with SuVeneer Clad Metal, wherever it can take the place of solid copper . . . and your product performance is increased with the added strength of steel!

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Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

NOW!

a TRANSPARENT CUTTING OIL that outperforms dark oils on heavy-duty work

• To make the part illustrated, sixteen 10-inch-long internal splines must be cut—a difficult machining job. The manufacturer* formerly used a dark oil, is now using new and improved *Texaco Transultex Cutting Oil* and is getting better tool life. At the same time, the transparency of the oil makes work inspections easier, thus reducing rejects.

*Name on request

It's new and improved TEXACO TRANSULTEX CUTTING OIL

Now, on heavy-duty cutting jobs, operators can see the progress of the work—yet get the same high cutting efficiency as with opaque oils. New and improved *Texaco Transultex Cutting Oil* has proved this in plant after plant.

New *Texaco Transultex Cutting Oil* is truly transparent and truly heavy-duty. Its active sulfur and other extreme pressure additives, plus an effective wetting agent, assure exceptionally fine cutting characteristics that stand up even in prolonged heavy-duty service. Today's *Texaco Transultex Cutting Oil* gives always-uniform performance, has good odor qualities, does not irritate skin.

Improve your heavy-duty machining by using improved *Texaco Transultex Cutting Oils*. There is a complete line of them; and a Texaco Lubrication Engineer will gladly give you full information and help you select the right one for your particular work.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

The Metalworking Outlook

December 31, 1951

The Expediters Are Back

A new era of expediting is upon us. Although not yet of World War II proportions, the role of the expediter in industry will loom large over the coming year. Setting the style for expediters will be these men in government: Alfred E. Howse, Kansas businessman who as a member of the Office of Defense Mobilization will supervise the placing of government contracts; Clay P. Bedford, Kaiser-Frazer vice president, becomes a weapons expediter for the Defense Department; William L. Campbell, vice president at Food Machinery & Chemical Corp., will run a production committee for DPA; W. D. Pauley, a former State Department trouble shooter, is a new assistant to the Secretary of Defense "to do something about machine tools."

A Case in Point

Expediters are needed because of rising shortages in this component, that tool, a metal product. A case in point turns up in the compressor industry. Of all the materials it uses, copper accounts for only 5 per cent of total consumption. NPA cut its next quarter copper allotments and it has trouble getting all of even what's authorized. Result: It probably won't be able to use all its steel allotments because of insufficient copper.

More Help on Components

The expediter technique will be used by NPA's General Components Division. The unit will not maintain any order board as is done for machine tools. Rather, when a sore spot develops in some particular component, the problem will be referred to a qualified industry man with instructions to solve the matter. Men to serve as expediters are now being lined up.

The Weather and Scrap

The weather and a seasonal letdown make the tight scrap situation tighter. Ice and snow in the Midwest are raising hob with collections. Up until three weeks ago, slight gains were recorded in scrap; now the situation is as bad or worse than ever. Watch for more deals such as the one in Chicago where 30,000 tons of unused trolley rails will be pulled up. That type of operation is expensive, and often a special OPS relaxation of price controls is required.

Scrapless Electric Furnaces

Electric furnaces that can turn ore directly into steel are possible, says H. S. Newhall, sales manager of Pittsburgh Lectromelt Furnace Corp.'s smelting division. Development of that kind of furnace would help solve the scrap shortage since the ore would be the only raw material charged into the furnaces. Lectromelt will build two such furnaces for South America. The unit has been proved in some 25 European in-

Production-Engineering News—p. 51 The Market Outlook—p. 81

stallations, but has never before been used in the Western Hemisphere. The South American furnaces will have a 200-ton daily capacity.

Groups for Small Business

Watch the fate of a grouping plan that would give small business more defense work. The proposal would establish groups of five to ten small plants, each group having the necessary combination of equipment required to turn out a specific item. One of the firms would act as prime contractor and the grouping would vary in accordance with the item to be produced.

Status Quo on Military Prices

Prices on many military items will remain uncontrolled. That's the sum and substance of a new agreement between OPS and the Munitions Board. OPS won't admit it publicly, but it would like a tighter rein on military procurement pricing. Part of the Munitions Board's argument against controls is that renegotiation will eventually remedy any errors. But OPS has won some concessions, including the promise of considerably more thorough information on procurement pricing and repricing than was made available to OPA in World War II.

Sixes and Sevens

Things are at sixes and sevens in the salary and wage stabilization agencies. The Salary Stabilization Board has a backlog of more than 8000 cases which is growing at the rate of about 400 a week. Economic Stabilizer Roger Putnam promises help, but it may be months before the backlog can be whittled to manageable proportions. The familiar split continues in WSB—the six industry members usually lined up against the 12 public and labor personnel. The latest disagreement is over a proposed liberalization of health and welfare benefit plans which the six industry men say is inflationary. WSB is also shivering in its boots over what the outcome of the steel wage dispute will do to its pay formula.

Straws in the Wind

Machines and machine parts supplanted cut flowers as the major item of air freight carried by United Air Lines during 1951 . . . Electric utilities plan to spend $2750 million for construction next year, $500 million more than in 1951 . . . Business loans rose by $223 million in the week ended Dec. 19—the highest increase in 14 weeks—to put total business loans at $21.4 billion . . . The Fairless Works being built at Morrisville, Pa., is sending land prices soaring in the area.

What Industry Is Doing

Record capital expenditures of $5.9 billion next quarter may push the 1952 total to $26.5 billion (p. 23) . . . Steel output hit a record 105 million tons in 1951 (p. 24) . . . The steel wage issue remain unresolved as industry, labor and government square off in a three-cornered fight (p. 25) . . . Industrial coal stockpiles are the highest in eight years (p. 26) . . . Piston ring manufacturers want to import half their pig iron requirements (p. 28) . . . Smaller civilian industries are faring poorly in the dual economy (p. 33) . . . The paradox of record production and record shortages is crimping Europe's industrial activity (p. 34).

"You may have to stand outside!"

REMEMBER Aesop's fable of the camel and his master--how the kind master allowed the shivering beast to put into the tent first his head, next his shoulders, then his forelegs!

And then the camel said, "Master, I think I ought to come wholly inside," and crowded in. Immediately he said, "There is hardly room for us both, so I think it would be better for you to stand outside so I can turn around and lie down." And without further ado, the camel kicked the man out and took the entire tent.

Men have heard this story for 2,500 years--repeatedly have seen how it illustrates what happens when one man or group of men gain power over others. Men saw it happen in Italy and Germany when Mussolini and Hitler took over. Men saw it happen in Russia.

Even here in America a similar trend is evident. Powerful influences overlook no opportunity, through political manipulation, central controls and bureaucratic regulations, to intrude more and more in our private lives. The situation demands continual, alert watchfulness by all citizens who believe in individual liberty and freedom, to prevent this camel of big government from creeping further into the tent. Before we realize it, "we, the people," the master, may find ourselves "standing outside." In America it is government, which is the servant of the people.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

Can Type 430 Substitute for Type 302?

Government restrictions are taking the popular 18-8 chromium-nickel stainless steels "out of the game" for many non-defense uses.

In selecting an alternate stainless steel for their products, many designers have turned to Armco 17 (Type 430)—a chromium grade.

To help you determine whether or not Type 430 is suitable for your products, we have just published a new folder listing satisfactory and unsatisfactory uses. Ask your nearest Armco Distributor for a copy.

In fabrication, Type 430 is not as ductile as Type 302. However, with slight changes in practice, many difficult forming and drawing operations can be performed on the chromium grade. Where welding is involved, Armco Type 430 Ti (a titanium modification) provides much more ductile welds than regular Type 430.

These and other fabricating problems are covered in detail in another new Armco bulletin, "How to Fabricate Type 430 Stainless Steel." Your nearby Armco Distributor will be glad to give you a copy.

ARMCO STEEL CORPORATION

4671 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

His Light Glows

A month or two ago, radio listeners heard a man with a pleasant Arkansas drawal talk about the Technical Cooperation Administration, one of the facets of the Point Four program. Listeners who expected him to stress the great cost of TCA were surprised, because dollars figured lightly in his discourse.

He related experiences in Ethiopia. He spoke glowingly of the progress made in that country when the natives were taught that a scythe is more effective than a sickle. He gave figures to show how much better the natives fared after they had been shown that a man can do more work with a hoe than with a crooked stick. To top it off, he said we do not need to give them the scythe or hoe. They will gladly pay for them once somebody has demonstrated their value.

Later this man appeared before Congress. His program of emphasizing education and training instead of advocating reckless spending appealed so strongly to the lawmakers that they voted him an appropriation of 200 million dollars more than he requested. Later he told a friend he expected to save the superfluous 200 million for the taxpayers. One congressman, after hearing him speak, burst out spontaneously with "You are just a breath of fresh air."

The breath of fresh air was Dr. Henry Garland Bennett, former president of Oklahoma A. and M. College, who joined the government service as an agricultural missionary to impart "know-how" to the discouraged tillers of soil in backward nations. His great contribution to the world is his doctrine that money or material gifts are wasted unless the recipient is shown how to use them intelligently. Had his sound advice been followed during the last two decades, many billions of dollars would have been saved and the status of millions of unfortunates would have been improved.

Dr. Bennett perished in a plane crash in Iran in line of duty. The impressive eulogies accorded him in most important newspapers throughout the nation show that people rate his ideas highly. He leaves a notable heritage. Thousands should step forward to carry it on through 1952 and following years.

Happy New Year

E. C. Shaner

EDITOR-IN-CHIEF

CAPITAL OUTLAYS GAIN: Strong support for the nation's economy in 1952 will be forthcoming from new plant and equipment expenditures, if nothing occurs to disturb presently anticipated projects. It is estimated that capital expenditures for the first quarter will amount to $5.9 billion, the highest on record for the first three months of any year. Expendi-

tures for the whole year may hit $26.5 billion, as compared with $24.8 billion in 1951.

Heavy outlays in the next two quarters will stem largely from projects approved for five-year amortization. The pattern will be somewhat different from recent expansion in that much of the heavy construction of plant has passed its peak and from now on major emphasis will be on the installation of equipment. Nevertheless, construction will continue on a relatively high plateau.

All major producing industries share in the increased capital outlays, with iron and steel and other heavy industries in the lead. —p. 23

* * *

COAL OUTPUT HIGHER: This nation's bituminous coal industry, consisting of 5000 companies operating 8000 mines, produced about 535 million tons in 1951. This is 20 million tons above 1950 output and about 100 million tons more than was produced in 1949, but it falls far short of the around 650 million ton average for the "good" coal years of 1942 to 1945 inclusive and 1947 and 1948.

Contributing to the increase in domestic coal consumption in 1951 was the greater use of coal by the expanding steel industry. It consumed 113 million tons, a new record. Steel's coal consumption in 1952 may rise almost to 130 million tons. Electric utilities accounted for 102 million tons of coal in 1951 compared with only 88 million in the previous year. An important factor in higher coal output in 1951 was the export of 37 million tons to overseas consumers, compared with less than a million tons last year. —p. 26

* * *

NOW "PURE" VANADIUM: As a result of research conducted by a number of companies, a process now is available for producing ductile vanadium metal of the following analysis: Vanadium 99.8 to 99.0 per cent, carbon .03 to .07, nitrogen .02 to .04, oxygen .05 to .12 and hydrogen .001 to .004 per cent.

Vanadium metal of this purity is lighter than iron, has good structural properties, resists pitting and corrosion by salt spray and sea water, can be rolled at ordinary temperatures, machines well and is easily welded by regular shielded arc methods.

The new material is produced by calcium reduction of vanadium trioxide. The product is a solid mass of crystalline vanadium which is termed "massive vanadium" to differentiate it from ingot metal. Enough now is known of massive vanadium to rate it as an engineering material of great promise. —p. 52

* * *

SAVE BY SALVAGING: Much timely emphasis is being placed upon the necessity of seeing that every possible pound of scrap is returned to scrap collecting channels as promptly as possible. Not as much emphasis is placed upon the equally desirable practice of salvaging scrap wherever it may take the place of newly rolled steel.

An excellent example of how such salvage pays dividends is provided by Ryan Aeronautical Co. Its engineers became disgusted with pickling baskets of 2 x 12-inch Douglas fir which disintegrated after 10 days of use. When a stronger pickling solution was introduced, wood for pickling baskets was ruled out. In the search of something suitable, somebody noticed the irregular strips of 5/16-inch thick stainless steel which were left over when the exhaust port flanges of aircraft engines were punched out on 65-ton presses.

The scrap strips were straightened and fabricated by arc welding into a number of experimental baskets. They were an immediate success. Their life is three months. They save money and conserve material. —p. 60

* * *

CAN'T PLEASE EVERYONE: As the old year draws to a close, the issue of prime immediate importance to the metalworking industries is the outcome of the government's efforts to effect a settlement of the demand of the steelworkers' union for higher wages.

In its role as final arbiter the government would like to arrive at a solution that will be reasonably acceptable to the steel companies so that they will continue to produce at peak capacity, that will not involve a major price increase, that will satisfy the union and that will seem to preserve a vestige of respectability for wage and price controls.

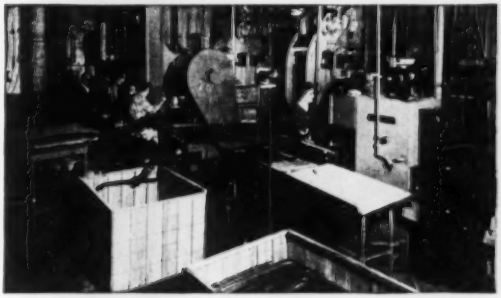
Obviously at this stage it is impossible for the government or any other agency to achieve all four of these objectives. Give and take probably will result in a compromise that will not satisfy anybody. —p. 25

Firestone STEEL PRODUCTS SPEEDS DEFENSE SUB-CONTRACTS WITH NEW PRODUCTION LINES

Automatic Machines and Integrated Production Turn Out Large-Size Stampings in Record Time

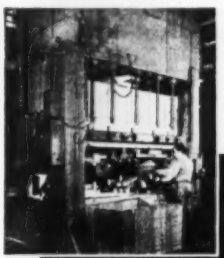
NEW automatic stamping machines are clicking out large-size stampings in record time at Firestone Steel Products, saving valuable time and money on defense sub-contracts. All production is integrated, from blanking through to painting or polishing.

Firestone's two modernized metal fabricating plants at Akron, Ohio and Wyandotte, Michigan have been completely retooled for fast, low-cost production of those heavy, large-size stampings and assemblies so vital to the speedy delivery of aircraft and ordnance equipment and accessories. If your problem is large size stampings in a hurry, wire or phone Firestone Steel Products Company, Stampings Division, Akron 1, Ohio.

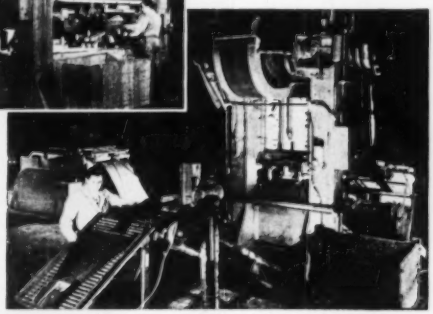


Assembly operations are closely integrated with presses at Firestone, saving time and money. As many as four operations are handled at one time on new multiple-operating presses in left background.

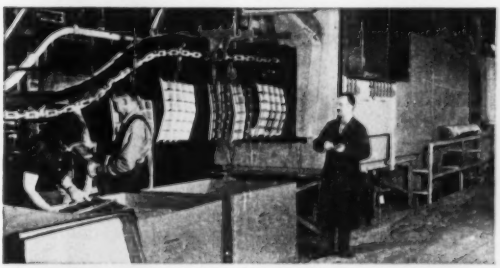
Fast, efficient, straight-line methods save time and handling at Firestone. Parts move from presses on rollers or overhead conveyors to next operation.



One of the huge multiple-die forming presses recently installed at Firestone for making jet engine components and parts for tanks.



One of the new completely automatic synchronized presses producing 2600 large-size blanks per hour. Steel is fed from roll at extreme left.



Washing, bonderizing, painting, and baking are handled in a continuous automatic operation, moving entirely on conveyors from the stamping line.

Copyright, 1951, The Firestone Tire & Rubber Co.

Machining Steel?

How to Gain Maximum Production

A good deal of helpful data is published on surface cutting speeds, feeds for standard tools, etc.—practical data that will help you gain maximum production from the steel you are cutting. Check over the following listing and see how much will be of value in your shop:

1. Comparative Surface Cutting Speeds for 49 different types of cold drawn steel machined on automatic screw machines.

   In one handy reference book, the surface cutting speeds (in feet per minute) for 49 A.I.S.I. analyses of both carbon and alloy steel reveal at a glance the cutting speeds obtainable from the various types of steel. A convenient percentage figure comparing each steel with A.I.S.I. B 1112 as a standard, gives you a quick comparison of relative cutting speeds.

2. Cutting Speeds and Feeds for Standard Tools.

   For each standard type of tool (form tools, twist drills, reamers, cut off tools, etc.) surface speeds and feeds obtainable are shown for different widths or depths of cuts or sizes of holes. Thus, with this detailed information, you can determine practical working speeds and feeds for all generally used steels by type of tool used, and easily compare the machinability of the various kinds of steel.

3. Additional Data for Quick Shop Computing.
   - R.P.M. of spindles at given surface speeds for work at various diameters
   - Approximate hourly production for various rates of piece production
   - Approximate stock required to make 1000 pieces
   - Keyseats in Shafting—width and depth dimension for different diameters
   - Relative Cutting Speeds of Drills
   - Decimal Equivalents of Twist Drills

If your shop can use machining data of this type, we urge you to call or write your nearby Ryerson plant. All of this helpful machining data is included on pages 173 through 191 of the new Ryerson Steel Data Book—a handy, shop-sized booklet we will be happy to send you.

We also invite you to discuss your materials and methods with our steel salesmen whenever you need more machining information. There certainly is no substitute for talking directly with experienced steel men when machining or steel problems come up. And their experience may be particularly helpful to you at this time.

Remember, both their experience and the booklet is yours for the asking.

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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
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Capital Outlays: The Supports Hold

A record $5.9 billion will be spent in the next three months on plant and equipment expansion, a major buttress in today's economy. Total 1952 spending may hit $26.5 billion

NEXT QUARTER'S anticipated new plant and equipment expenditures of $5.9 billion, an alltime high for the first three months of any year, foreshadow record capital outlays in 1952.

Capital expenditures, a major support in today's economy, are rising partly because of inflation, but physical gains will also be made in the next three months, a period when expansions usually are the lowest for the year. The total spending may hit $26.5 billion in 1952, compared with $24.8 billion in 1951 (see the chart).

Estimated—The 1952 figures are estimated by STEEL from figures supplied by the Department of Commerce and the Securities & Exchange Commission. The data is derived with 1940 as the base year. The government agencies have just started a new and not yet completely refined series with 1948 as the base year. Under that series, next quarter's outlays would be $5.7 billion.

The anticipated $5.9-billion outlay in the next three months is 13.5 per cent greater than that for the first quarter of 1951. It is stimulated by heavy spending for many of the $8 billion worth of projects approved thus far for five-year amortization. Second quarter expenditures should surpass $6 billion comfortably because activity on many fast write-off jobs will then be at the peak. Spending should level out but still be high during the rest of the year.

Emphasis Shifts—Up until now, the emphasis in capital equipment expenditures has been on construction, less on equipment. That will be reversed in 1952 because the climax in plant building has been passed. Construction, though, will remain on a high plateau.

All major industries, other than commercial and miscellaneous categories, will contribute to next quarter's increase. Transportation equipment companies (except motor vehicles) and the metals producing industries have scheduled next quarter expansion of more than twice that in the same period of 1951. Outlays for iron and steel companies show the greatest increase—about 120 per cent. Since last summer, only the larger manufacturing firms have continued to show increasing rates of fixed investment. In part, that reflects the greater concentration of smaller companies in nondefense activities. Expenditures in nondefense activities—food, beverages, textiles, lumber, printing and publishing are off from the peaks that were reached six months ago.

Warner & Swasey Builds Plant

Warner & Swasey Co., Cleveland machine tool builder will build a $1.5 million plant in New Philadelphia, O., to produce machine tool parts. It's scheduled to be in partial operation by next June.

Machine tool parts manufactured in the new plant will be shipped to the company's Cleveland facility where $1 million worth of new heavy machinery is being installed. The new plant, plus new equipment in Cleveland and subcontracting are expected to boost output at least 50 per cent.

$100 Million in the Northwest

Some $100 million worth of major civil construction work and supply items for the Pacific Northwest will be contracted during the first two quarters of 1952.

Eight jobs at Chief Joseph dam on the Columbia river in Washington will approximate $52 million, the largest for power and intake structures. Five projects, totaling $12 million, will be for the Albeni Falls dam, Pen Oreille river, Idaho.

More West Coast Shipbuilding

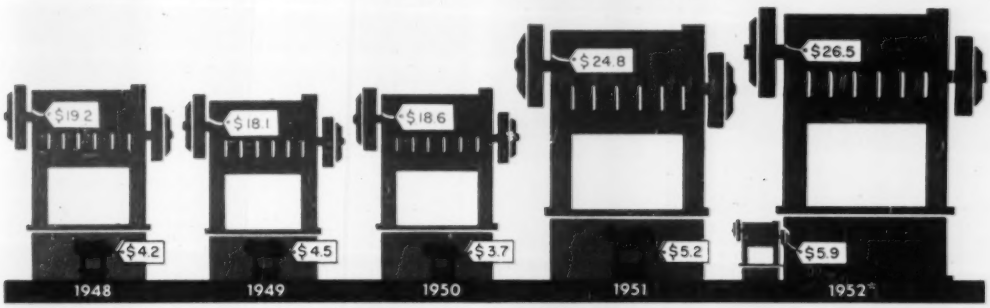
Delayed several months because of lack of steel, construction of five "Mariner Class" ships at the San Francisco Yard of Bethlehem Pacific Coast Steel Corp., shipbuilding division, now is expected to get under way in earnest next spring as a result of word that steel for the program has been cleared for second quarter delivery.

Admiral Edward L. Cochrane, chairman of the Federal Maritime Commission, for whom the ships will be built, has advised T. C. Ingersoll, general manager of the shipbuilding division, that the NPA now has given the "green light" to the program.

But, Mr. Ingersoll pointed out, "it will be up to us to get on the rolling schedules of the mills. However, it is hoped that 10,000 tons of the 35,000

Big Plant, Equipment Expansions Next Quarter Foreshadow Peak 1952 Spending

Yearly Totals Compared With First Quarter Expenditures. All Figures in Billions of Dollars



*Estimated by STEEL, based on Commerce Department and Security & Exchange Commission figures. All data are from the series with 1940 as the base year

tons of the total steel needed will be forthcoming in the second quarter, permitting us to get started on the first keels by August."

The yard now is employing about 2100 workers. At the peak of the cargo-passenger ship program, Ingersoll added, probably 3000 to 3500 men will have been added to this working force. The local labor force, he believes, probably will be able to supply the necessary men.

$1.5 Billion Sales in 1951

Materials handling equipment sales will approximate $1.5 billion in 1951 and will probably exceed that volume next year by 5 or 10 per cent when defense requirements are expected to reach peak by mid-1952. Sales programs and planning call for increasing national sales to manufacturers of civilian products once the defense peak is over.

L. West Shea, manager of material handling sales, The Union Metal Mfg. Co., Canton, O., was elected president at the annual meeting, Materials Handling Institute, Inc., New York. Howard M. Palmer, general sales manager, Lewis-Shephard Products Inc., Watertown, Mass. was named second vice president while John C. Mevius, sales manager of materials handling and hydraulic division, American Engineering Co., Philadelphia, moves up to vice president.

Industry has a large backlog of orders for equipment with the field constantly broadening, including metalworking shops, department stores and food distribution. There are 78 materials handling manufacturers actively interested in institute programs, including producers of conveyers, monoroils, tramrails, casters, cranes and hoists, industrial trucks, and pallets.

License Plates Cut

Owners of the nation's more than 52 million motor vehicles will have to use their 1952 license plates also in 1953, says NPA.

Steel and aluminum will be allocated quarterly to each state for the manufacture of tags, clips or tabs to revalidate 1952 plates for use in 1953. About 80 per cent of the steel and aluminum previously allocated for the manufacture of full-size plates will be conserved. In 1950 a total of 34,000 tons of steel and aluminum was processed for license plates. In 1951 36,000 tons of those materials were used. Plates already made for issuance to motor vehicle owners in 1952 required 31,000 tons of steel and 530 tons of aluminum. Eighteen states already have voluntarily instituted conservation of steel and aluminum for 1952 license plates.

Peak Steel Output in 1951

The industry operates over the year at above 100 per cent of capacity

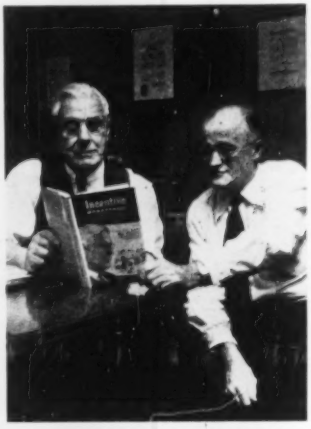
THE STEEL industry produced a record 105 million tons in 1951, says American Iron & Steel Institute. This year's output is the first ever to exceed 100 million tons.

The industry employed an average of about 670,000 persons in the making and distribution of iron and steel during 1951. The payroll was more than $2.8 billion, an increase of 20 per cent over the highest previous total, in 1950. An additional $900 million was paid in 1951 to miners and others in non-steelmaking operations. In addition the dollar value of employee benefits multiplied nearly five-fold from 1946 to 1950.

Income Dropped — With income taxes sharply higher in 1951, the combined net income of steel companies accounting for 75 per cent of the total shipments of finished steel declined 21 per cent in the first nine months of 1951, compared with the same part in 1950.

To accomplish the prodigious production feat of 1951, steelmaking furnaces poured an average of 200 tons of steel every minute, night and day, all year. They were operated at an average slightly over 100 per cent of rated capacity, a performance never before duplicated. The year's production was more than the two-year total steel output of all other countries combined in 1945 and 1946.

Capacity Up—The annual steel capacity is now about 107 million tons of ingots. By next July 1, expansions will boost capacity to about 113.5 million tons. One year from now it will be 118 million tons, and two years from now it will be 120 million tons.



PRIMER FOR MANAGEMENT: After demonstrating that the ideas work, James F. Lincoln of Lincoln Electric Co., Cleveland, wrote a book on developing incentive and team spirit among factory employees. The book, "Incentive Management," stresses recognition of individuals

RFC Pays Handsome Dividend

Reconstruction Finance Corp., one of the world's largest lending institutions, paid a handsome 7.6 per cent dividend in 1951 to its sole stockholder—the U.S. Treasury. Total dividend amounted to $16,345,812 on the capital stock of $100 million but almost $9 million of this resulted from downward adjustment of reserves for losses.

RFC also turned over to the Treasury $75 million from proceeds on production programs in synthetic rubber and tin, and from liquidation of wartime assets. An additional $4 million was paid from liquidation during the year of assets of the former Smaller War Plants Corp.

In the fiscal year, the corporation approved 3271 loans totaling $290 million and disbursed $207 million on 2797 loans. Nearly 90 per cent of the loans authorized in the year were for amounts of $100,000 or less. At the close of the year approximately 11,000 business concerns owed the agency some $606 million. This represents a decline of 1092 loans and $108 million from one year earlier. Reduction of outstanding dollar amount is due largely to full repayment on the $92 million Kaiser Steel Corp. loan.

RFC sales of refined tin during the year totaled 39,077 long tons and netted $9.6 million.

No Fast Writeoffs With ICC

Railroads may not show fast amortization of new facilities in earnings reports filed with Interstate Commerce Commission. That's the final decision on the question by the commission. It means that carriers will have to refile accounts with the agency taking out any rapid amortization recorded since Dec. 31, 1949. Earnings reports filed with the Internal Revenue Bureau for tax purposes are not affected by the ICC decision. Through 1951, the commission estimates that roads have been granted about $1.5 billion in fast writeoff certificates—most of them for permanent facilities. The ICC ruling applies only to facilities that roads will be able to use after the present emergency passes.

SCENE FROM ACT II: The performance, to which the whole country is an audience, began in Act I when United Steelworkers of America asked for sizable wage increases and the steel industry replied it couldn't afford them without increasing prices. Act II found Cyrus Ching, federal mediation chief, attempting to reconcile the two principals. Act III, now in progress, finds a new set of principals in the act, the Wage Stabilization Board. In Act II, U. S. Steel's John A. Stevens (left) talks with Cyrus Ching and Philip Murray (right) of the USA

Three-Way Wage Battle Shapes up in Steel

The industry, the union and the government all are fighting for their points as the issues remain unresolved—Net result: Nobody's happy

THE ISSUES in the steel wage dispute remain unresolved in a three-way fight, even though the union last week agreed to work until a special membership meeting Jan. 3, at which time a truce is expected to be approved that will keep peace while a U. S. board deliberates.

In one corner is the steel industry which says it can't raise wages without boosting prices. In the second corner is the steel union which bluntly admits it's trying "to break the wage formula." In the third corner is the government which claims it won't permit steel prices to increase and also says that "a steel strike now is unthinkable."

Industry Position—The steel companies argue that no wage increase approaching what the United Steelworkers of America wants can be granted without a price increase. Higher materials and other costs which have been absorbed since prices were frozen last January make it impossible to absorb higher wages.

U. S. Steel President Ben Fairless says if the union will drop its wage demands his company will keep its prices as they are. If wage increases are approved by the government without commensurate price hikes, the industry argues that it could not afford to operate and might as well resign itself to a strike.

Labor Position—The union wants a 15-cent basic-pay increase that would raise the lowest wage rate from $1.31 to $1.46 an hour. Average hourly earnings in the industry now are $1.97. The steelworkers also want six paid holidays that would add 4.5 cents an hour to demands, paid vacations that would add 8 cents an hour and a ½-cent increase in the present 5-cent differential between job classifications. There are 32 job classifications, so that last demand would add up to 15 cents an hour to demands and would bring the total package to 35 or 40 cents an hour.

Steelworkers President Phil Murray says the steel companies can afford and absorb a "substantial" pay hike. He claims the cost of living has outpaced the steelworkers' earnings (although actual figures show otherwise; see STEEL, Nov. 12, p. 47). The odds are that the union would settle for about 15 cents an hour.

Government Position—The government's position is obscured by the pot shots it's taking at the steel industry. U. S. charges about steel profits are designed partly to placate the labor vote, only partly to prove that the industry can afford higher costs. One OPS claim that steel's 1951 earnings before taxes of $2.6 billion are $1.2 billion in excess of "generally fair and equitable" standards has already been largely disproved as "meaningless" and erroneous. A U. S. Steel official points out that any before-taxes earnings estimate is "meaningless" because taxes "are definitely a cost of doing business."

Actually, the government wants the impossible: Reasonably satisfied steel companies which will continue to produce at a peak clip; no major steel price increase; a well satisfied steel union; at least the vestiges of price and wage control programs. It can't win any one objective without losing at least one other. Coming up, then, will be a complicated balancing act whereby the union will get not quite what it originally would settle for, the steel companies will get not-quite-adequate price boosts and the fiction will be maintaind that price and wage controls are intact. Net result: Nobody will be happy.

Westinghouse Settles With IUE

Second wage increase of 1951 was granted by Westinghouse Electric Corp. to AFL and CIO unions. Agreements provide for raises ranging from 5 to 10 cents an hour—retroactive to Nov. 1—and for liberalized vacation rules. Both agreements are subject to approval by the Wage Stabilization Board. Subject of wages and salaries may be re-opened at any time in the period between April 1 to 30, 1952. Latest agreement was reached between the company and International Union of Electrical Radio & Machine Workers-CIO. The IUE represents 43,000 Westinghouse employees. AFL's International Brotherhood of Electrical Workers had previously accepted the same offer.

California Outlook Sunny

Business and employment in California will continue at a high level in the first quarter of 1952, it is forecast in a survey just completed by the California Manufacturers Association. More than 900,000 persons, or approximately 20 per cent of all civilians employed in the state, are engaged in manufacturing.

The CMA poll indicated that 71 per cent of the manufacturers expect their sales to be equal to or ahead of the March quarter of 1951.

Plenty of Coal

Industrial stockpiles are the highest in eight years, as 1951 output soars

ABOVE-GROUND soft coal stocks today are higher than at any other time in the past eight years, reports Bituminous Coal Institute. Industrial stockpiles and coal in retail yards rose from 72.5 million tons a year ago to 78 million tons on Nov. 1.

The industry produced about 535 million tons of bituminous coal in 1951. That's more than 20 million tons above the 1950 level and almost 100 million tons more than the 437 million-ton output of 1949.

Up and Up—Domestic consumption of bituminous amounted to 465 million tons, an advance of 11 million tons over 1950. Among the major markets, the steel industry used 113 million tons, a new high and a gain of 12 per cent over 1950. The electric utilities used 102 million tons in 1951, compared with 88 million tons in 1950. The scheduled expansion in steel may require as much as 15 million tons more of coal in 1952 than 1951. The electric power output is steadily rising, and coal's share of power generating is increasing. That means a good increase in the coal tonnage which utilities will take in 1952.

Industries other than steel and electric utilities consumed 115 million tons of bituminous in 1951. In addition, Class I railroads took 55 million tons. Retail coal dealers handled the remaining 80 million tons of the 465 million consumed in the U. S. in 1951. Some of the retail tonnage went to small industrial plants, but the major part went to heat 14 million dwelling units.

High Exports—More than 37 million tons of bituminous were exported overseas in the last 12 months. Of that total, 32 million tons went to West Europe (including Britain), compared with less than 1 million tons in 1950. Shipments abroad will be even higher than 37 million tons in 1952. Some 50 million tons might be exported if shipping and financing can be arranged. Shipments of U. S. soft coal to Canada in 1951 totaled about 22 million tons, 1 million less than in 1950. The 1952 deliveries to the dominion should match or slightly surpass the 1951 performance.

The bituminous industry consists of 5000 companies operating about 8000 mines. More than 90 per cent of all the coal mined underground is mechanically cut and about 70 per cent is mechanically loaded. Surface mining, which accounts for in excess of 20 per cent of all production, is wholly mechanized. To clean the coal and otherwise treat it for consumers, there are now about 600 preparation plants in the 20 leading production states, and more than 200 million tons of bituminous were mechanically cleaned in 1951.

Steel Firms Buy Coal Mine

National Steel Corp., Youngstown Sheet & Tube Co. and Steel Co. of Canada will have two-thirds interest and Pittsburgh Consolidation Coal Co. one-third interest in the new Mathies Coal Co.

The steel companies joined in the venture to increase their supplies of metallurgical coal. Mathies will purchase Pittsburgh Consolidation's Mathies mine, one of its newer and bigger producers, 18 miles south of Pittsburgh. The Mathies mine is producing at the rate of about 1,750,000 tons of bituminous annually, but probably will increase its output. Its production will be sufficient to take care of coal requirements of present Pittsburgh Consolidation customers, as well as the needs of the three steel companies.

For the two-thirds interest in the Mathies mine which it is relinquishing, Pittsburgh Consolidation will receive $13 million.

VERTICAL DIGGING LATER: Cutting a new roadbed through rugged country, an International crawler and a LeTourneau scraper work on the railroad right-of-way to the heads of new mines near Stonewall, Colo. The mines, operated by Colorado Fuel & Iron Co., are expected to deliver 10,000 tons of high grade coking coal daily

Rubber Will Stretch Enough

The rubber industry in 1952 should be able to meet the demand for industrial and other rubber products, predicts H. E. Humphreys Jr., president of United Sates Rubber Co.

He says sales next year should run about 6 per cent ahead of the record-breaking 1951 total of $5 billion. Total rubber consumption for the U. S. is estimated at 1,336,000 tons for 1952, an increase of 8 per cent over 1951. Of that total, about 65 per cent will be synthetic.

Troubles in Diamonds

Representatives of all segments of the diamond wheel manufacturing industry met today to form an industrial diamond salvage committee.

The scarce product is used in diamond bonded grinding wheels, diamond-tipped tools for trueing and dressing grinding wheels, diamond drill bits, diamond dies for drawing fine wire and shaped diamond tools. Crushing bort and diamond powder, the types of industrial diamond abrasives now in shortest supply, are essential to the production of jet aircraft, armor piercing shells and other defense armament.

The salvage committee will start a campaign in line with the principles of other current scrap campaigns.

A new pricing regulation is being considered for imported industrial diamonds, now covered by CPR 31.

West Needs More Power

Industry already operating in California will require 38.1 per cent more electrical energy in 1954 than was consumed in 1950, according to a sampling of opinion by the California Manufacturers Association. The opinion obtained from 715 manufacturing plants indicated there also would be a need of 29.5 per cent more "uninterrupted" gas.

The association's findings showed that nearly 28 per cent of California's annual industrial use of electric energy is used by the iron, steel and wire industry. Second largest user is the rubber industry with approximately 11 per cent.

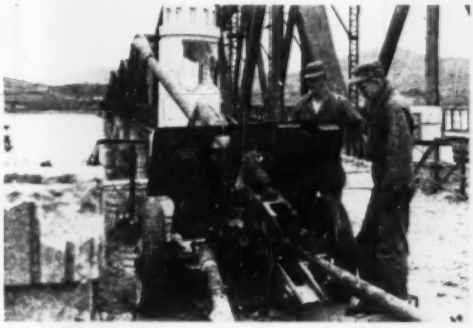
Army Unveils New Infantry Rifle

The new infantry rifle, which reportedly will make a machine gunner out of every soldier, was revealed by the Army last week at Aberdeen, Md. The weapon may be operated as a fully or semiautomatic rifle at the option of the soldier.

Weighing eight and one-half pounds, the new rifle is slightly lighter than the standard Army Garand rifle which weighs nine and three-quarter pounds. It has not yet been adopted by the Army, but is being thoroughly tested.

War Booty: Russian-Made Weapons, Vehicles Captured in Korea

NO ONE HOME: Mortal enemies are this South Korean soldier and a captured self-propelled SU-76, consisting of a 76-mm artillery piece mounted on the chassis of a T-34 tank



TROUBLEMAKER: This Ynson river scene would be peaceful but for the 76-mm field gun and scattered signs of the devastation wrought at approaches to the railroad bridge

NO TOYS THESE: Looking for all the world like toy howitzers, these heavy machine guns lined up for operational inspection have heavy wheels and armor plate shielding

NO SERVICE STATION: After capturing this Russian-made jeep, the Australian soldier finds he must fix a flat tire before the vehicle can once more be pressed into service

MOVING BY RAIL: On its way to the rear lines, this big armored vehicle lashed to a railway flat car gets the once-over from an American officer and South Korean soldier

SOAP BOX ENTRY: Temporary plaything of these two GIs is this BA64 light armored car with the inevitable adornment of nicknames. Note exhaust muffler behind front wheel

Pig Iron for Piston Rings

There's not enough iron, so manufacturers hope to import half their requirements

PISTON ring manufacturers hope to import half their pig iron, so they can maintain their present production pace. Thus far, pig iron has not been allocated by NPA.

The industry, which consists of some 100 companies making all types of piston rings, uses relatively little pig iron, but 98 per cent of its production depends upon it. About 2 per cent of the output is in steel or nonferrous metals; the rest is in gray iron. No one in the industry will say exactly how much pig iron is used, except that it's "more than 3 million pounds annually."

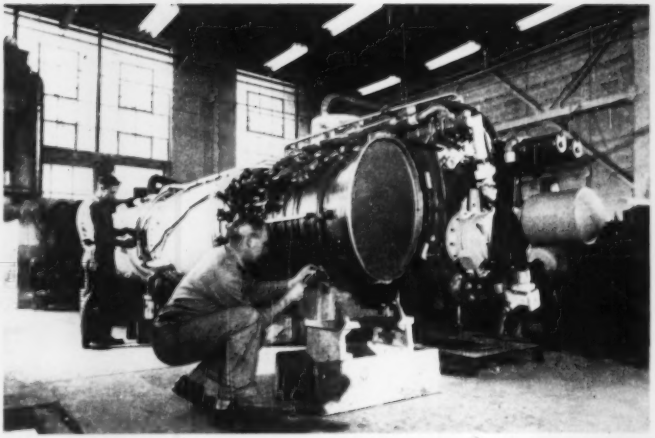
The Problem—The difficulty is that piston ring manufacturers require pig iron of special grades and specified analysis types. Even though we are now importing the material at the annual rate of about 1 million tons, little of it is the grade necessary for piston ring makers who normally rely on domestic stacks for nearly all their supplies.

Representatives of some companies have made inquiries abroad, especially in England, and hope to find some foreign producer who can meet their specifications. Manufacturers believe chances for success are good because the total tonnage required won't be large.

An estimated 40 per cent of all piston rings manufactured go for new replacement automotive markets. The other 60 per cent go into farm machinery, aircraft engines, diesels, pumps, compressors and other equipment. Some 65 per cent of all the automotive capacity is for the replacement market; the remaining 35 per cent goes to the automobile assemblers.

Business Off—Because of declining production in new cars, few piston ring manufacturers think 1952 business will match the 1951 level, but it can still be high if they find enough pig iron. Defense work thus far has been in small volume, mainly for reciprocating aircraft engines, ordnance vehicles and submarines. An upturn in that type of business is expected in the last half of 1952.

For the long term, many piston ring manufacturers are optimistic because a "tremendous market" is opening up for sealer rings used in automatic transmissions. The shift to the shiftless transmission will be curtailed by NPA restrictions, but it's bound to come eventually.



WOOD, GLUE AND SCREWS: This is only a wooden mock-up of the Westinghouse J-40 jet aircraft engine at the company's Aviation Gas Turbine Division, South Philadelphia, Pa. A precise replica of the engine now in quantity production for the U. S. Navy, the mock-up assists airplane designers working out allowances for size and accessories in keeping the engine up to date

Small Businesses Turn Prime Contractors for the Air Force

SMALL BUSINESS, not content with subcontracts, has obtained $27 million in Air Force prime contracts within the last five months.

Awarded to 115 small concerns was $5,168,512 worth of advertised contracts; 131 small business firms received negotiated contracts valued at $22,691,636.

Credited as being the biggest factor in the increase of small prime contractors for the Air Force is the unique screening and purchasing system used by the Air Force. Contracts exceeding $10,000 in value are screened in the Air Materiel Command's Directorate of Procurement and Production. Those deemed adaptable to small plants are widely circulated among small businesses to encourage their bids. If the contract is ultimately awarded to a large producer, the Air Force buyer must file a written explanation for his action.

Contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
Radial Drills	Carlton Machine Tool Co., Cincinnati
Stretch Presses	Hufford Machine Work Inc., Redondo Beach, Calif.
Gasoline-water Separators	American Pipe & Steel Corp., Alhambra, Calif.
Alternator Drives	Sundstrand Machine Tool Co., Rockford, Ill.
Aircraft Jacks	General Tire & Rubber Co., Akron, O.
Pivot Shaft and Ring Assemblies	Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.
Road Graders (2 contracts)	Adams Mfg. Co., Indianapolis
Pavers (2 contracts)	Foote Co. Inc., Nunda, N. Y.
Snow Plows (2 contracts)	Klauer Mfg. Co., Dubuque, Iowa
(2 contracts)	William Brothers Bailer & Mfg. Co., Minneapolis
	Snook Rotary Snow Plow Co., Windom, Minn.
Rotary Sweepers	Wayne Mfg. Co., St. Pomona, Calif.
Tractors	International Harvester Co., Melrose Park, Ill.
	Allis-Chalmers Mfg. Co., Milwaukee
Steel Patrol Vessel	General Ships & Engine Works Inc., Boston
	Avondale Marine Ways Inc., New Orleans
Diesel Generating Units	Cooper Bessemer Corp., Mount Vernon, O.
Heater Kits for Trucks	Perfection Stove Co., Cleveland
Power Plants for Tanks	Cadillac Motor Car Div., General Motors Corp., Detroit
Mounted Air Compressors	Le Roi Co., Milwaukee
Mounted Bituminous Material Distributors	E. D. Etnyre & Co., Oregon, Ill.
Truck Bodies	Perfection Steel Body Co., Galion, O.
Fire Extinguishers	General Detroit Corp., Detroit
Sewing Machines	Singer Sewing Machine Co., New York
Guns	Firestone Tire & Rubber Co., Akron, O.
Electric Detonators	National Fireworks Ordnance Corp., West Hanover, Mass.
Metal Parts for Rocket Motor Assemblies	Evans Products Co., Plymouth, Mich.
Practice Rocket Head Assemblies	Inland Equipment Co., Nashville, Tenn.
Photoflash Bombs	Unexcelled Chemical Corp., New York
Dynamotors	Electrolux Corp., Old Greenwich, Conn.
Echo Boxes	Fairchild Camera & Instrument Corp., Jamaica, N. Y.
Wheeled Stretchers	S. Blickman Inc., Weehawken, N. J.
Aircraft Cameras	Credda Inc., New York
Airplanes	Kaiser Mfg. Corp., Willow Run, Mich.
	Beech Aircraft Corp., Wichita, Kansas
	North American Aviation Inc., Los Angeles
Aircraft Tanks	Marine Aircraft Corp., Ft. Worth
Engine Analyzers for Aircraft	Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

STORAGE BATTERIES—NPA Order M-93, issued Dec. 19, 1951, limits on and after Mar. 1, 1952, the production of automotive storage batteries to those with life expectancies of at least 18 months and prohibits the output of high ampere-hour deluxe models. The order also limits monthly production of batteries of a specific ampere-hour rating within the listed classifications to the amount manufactured or rebuilt in the same month of 1951.

TOOL STEEL—Amendment of Dec. 19, 1951, of Schedule B of NPA Order M-80 excludes plain carbon steel from the definition of tool steel, and adds hand hacksaw blades to the list of items in which Class B high speed steel is prohibited.

ELECTRIC UTILITIES — Amendment of Dec. 19, 1951, of NPA Order M-50 permits electric utilities to obtain controlled materials in excess of minor requirements quotas in cases of emergencies. The amendment was effective Dec. 20, 1951.

STEEL DRUMS—Amendment of Dec. 20, 1951, of NPA Order M-75 modifies limitations on steel shipping drum inventories to permit packers greater flexibility in operating within their quotas. The amendment was effective Dec. 20, 1951.

Controlled Materials Plan

MRO—Amendments of Dec. 20, 1951, of CMP Regulations 5 and 7 permit manufacturers and repairmen to use priority ratings for obtaining materials for installation of industrial equipment and household appliances and to bring other provisions of both regulations up to date. Both amendments were effective Dec. 20, 1951.

NPA Regulations

CERTIFICATION—Interpretation 2 of NPA Regulation 2 states that when a customer signs a purchase or delivery order the signature may also serve in most cases as the signature for certification of the fact that the order complies with NPA regulations. Interpretation 2 was issued Dec. 19, 1951.

LABORATORIES—Direction 4 to NPA Regulation 2 provides limited assistance to vital civilian laboratories to obtain electron tubes and resistors needed to carry on essential defense and civilian work. This direction permits manufacturers of these tubes and resistors to arrange deliveries of small rated orders without regard to chronological receipt of the orders. The only exception is a DX-rated order, which maintains its top priority status and shipment of which cannot be delayed by a shift in delivery dates. Direction 4 was effective Dec. 19, 1951.

Price Regulations

PRICE LIST USE—Amendment 25 of the General Ceiling Price Regulation clarifies a provision of the GCPR under which manufacturers and wholesalers may establish ceiling prices by reference to bona fide price lists. Amendment 25 was effective Dec. 19, 1951.

AIRCRAFT—Amendment 12 of General Overriding Regulation 9 suspends from price control all sales of new and unused aircraft and of components, parts and subassemblies which can be used only in aircraft. Amendment 12 was effective Dec. 19, 1951.

SMALL MANUFACTURERS—Supplementary Regulation 5 to Ceiling Price Regulation 30 provides a simpler pricing method on and after Dec. 26, 1951, for manufacturers of machinery and related products whose net sales did not exceed $1 million for their last complete fiscal year ended not later than July 31, 1951.

COPPER PRODUCTS—Manufacturers of copper wire mill products are covered now by a tailored ceiling price regulation. It is Ceiling Price Regulation 110, effective Dec. 26, 1951. Simultaneously, Amendment 26 to CPR 30 removes from that regulation (CPR 30) covered insulated electrical cable, insulated electrical wire and certain other copper wire mill products. Also, Amendment 6 to CPR 67 places resellers of copper wire mill products under CPR 67. Insulated electrical wire and cable and electrical cable accessories already are covered by CPR 67.

Wire, Cable Shortage Looms

A new major problem is developing in the field of controlled materials: Serious trouble is ahead in copper and aluminum wire and cable. It arises partially from an unprecedented demand for telephone wire, for new depots, camps, manufacturing plants and other facilities. There are also the huge needs of the electric utility companies and of the new plants in the expansion programs which require electrification to be satisfied. The sum of these demands is well above present supply.

Due to the shortage of power transmission cable, many plants now under construction will have difficulty in completing their electrification on schedule. The stark fact is that no allocations of power transmission cable yet have been made for electrification of numerous steel, aluminum and other plants now under construction.

Hopes that the shortage of copper cable might be remedied by utilizing aluminum cable are not materializing on the needed scale.

The fact is that virtually all first quarter output of insulated aluminum cable, about 6 million pounds, has been earmarked for the DEPA for allocation to public utilities. That leaves nothing for first-quarter steel and other expansion programs. Current emphasis is on ascertaining to what extent production can be increased in the second quarter when the need will be more pressing.

HEAVYWEIGHT CONTENDER: Details of the newest and biggest U. S. tank, the T-43, are blacked out against the setting sun for security reasons. The T-43 is produced at the Chrysler Delaware Tank Plant in Newark, Del., which was started less than ten months ago. Production is more than a month ahead of schedule, but exact production figures are not revealed

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Mistreatment of vendors is the reason some government contractors can't get vital parts, NPA finds. It tells contractors it can't handle procurement for them

JUST AS IMPORTANT as good customer, public and industrial relations—in times like these particularly—are good relations with the companies that supply you with materials, parts and services.

These vendors, vital to nearly every metalworking company's existence, can cause plenty of damage if mistreated. Some firms that made this mistake are suffering the consequences now, as a look at a few of the numerous cases that come up before the National Production Authority for assistance shows.

Complaints — One contractor to the armed services came to NPA for help in obtaining vitally-needed components. He complained that the half-dozen suppliers that could furnish the parts all told him they were too busy to take his order. NPA officials—businessmen themselves—checked with the vendors and found the contractor's reputation was the root of his trouble. Vendors reported he played one against the other, always pressing for unjustifiably low prices and consistently taking advantage of them when business was scarce. None felt he owed any loyalty to this equipment builder.

Another similar complaint was that a contractor is "poor pay." He habitually holds up vendor's money and insists on taking cash discounts months past the due date.

Advice — NPA tells these contractors that it can't handle procurement for them. A concern that can't depend on its vendors, says NPA, has no justification for taking a contract in the first case. Some companies are taking this advice to heart. To win the loyalty of their suppliers, they are sending top executives to engender good will with suppliers.

Housing For Radioisotopes . . .

Rapid expansion of radioisotope uses in industry is creating a need for design standards for buildings housing the atomic energy by-product. A special conference on that subject was scheduled by the Building Research Advisory Board in co-operation with the American Institute of Architects and the Atomic Energy Commission. Discussed were problems of laboratory layout and construction, shielding, surfaces and finishes, air supply and exhaust, waste disposal, etc. For copies of proceedings (scheduled for distribution in three or four months) apply to BRAB, 2101 Constitution Ave., NW., Washington 25.

New NPA Division Heads

NPA's Iron & Steel Division has seen a turnover of top personnel from industry. Herbert Johnson (Jones & Laughlin Steel Corp.) was sworn in as director of the division, succeeding W. B. Quail (Armco Steel Corp.). J. Douglas Darby (U. S. Steel Corp.) is new deputy director succeeding Mr. Johnson. Mr. Quail returns to his industry job.

Gentlemen's Agreement . . .

An understanding has been reached between the Selective Service System and the Office of Defense Mobilization for fast action on deferment appeals of key workers in machine tool plants called up in the draft. Employer first must appeal to his local draft board and, if he doesn't find co-operation there, can go to his state draft board and finally to Major General Louis B. Hershey, director of the Selective Service System in Washington. Indications are that Selective Service now understands manpower needs of the machine tool industry and that heavy raids on its personnel won't be repeated. This arrangement applies only to draftees under the Selective Service Act. It does not cover reserve officers and enlisted men. Appeals of reservists still must be taken up as before with the armed services involved in each case with final appeal to Mrs. Anna M. Rosenberg, assistant defense secretary.

TCA Disaster In Iran . . .

Top echelon of the State Department's organization for executing programs of technical assistance to foreign nations was wiped out in the airplane disaster just north of Teheran, Iran, Dec. 23. Involved were Dr. Henry Garland Bennett, head of the Technical Cooperation Administration, and three key assistants: Benjamin Hardy, James T. Mitchell and A. Cyril Crilley. The party planned talks with the Iranian government on proposed economic developments in that country.

Spreading It Thin . . .

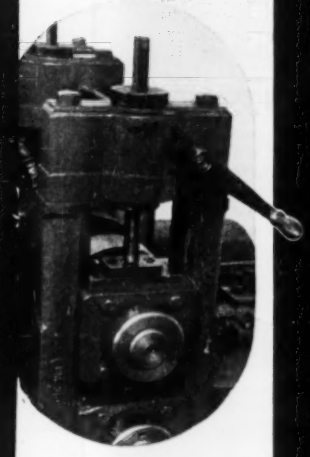
An improved type of farm machine is needed by corn farmers of the nation, says G. A. Cumings, agricultural engineer, who heads the Department of Agriculture's fertilizer placement machinery research. Fertilizer, he says, properly placed in relation to the corn seed, can make a tremendous difference in the total feed grain yield. There remains an over-all equipment problem, says Mr. Cumings: To develop machinery that will place larger amounts of fertilizer accurately and safely, yet effectively in relation to the corn seed.

The farm custom of drying newly-harvested grain, particularly corn, with natural air was found to cost less than hot-air drying but to be an undesirably slow procedure. That was shown in a report by the Agriculture Department's Agricultural Research Administration. Forcing natural air through high-moisture shelled corn stored in deep bins on warm fall days resulted in severe molding in 3 to 7 days. ARA recommends the use of "batch" and "continuous" types of grain dryers; both types furnish heated air for the drying.

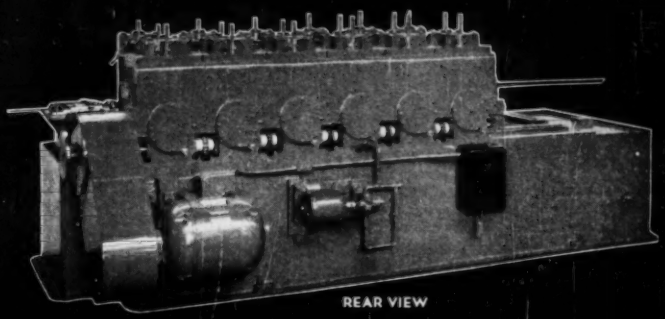
McKAY

ROLL FORMING MACHINES FOR PRODUCING SHAPES FROM FLAT STRIP.

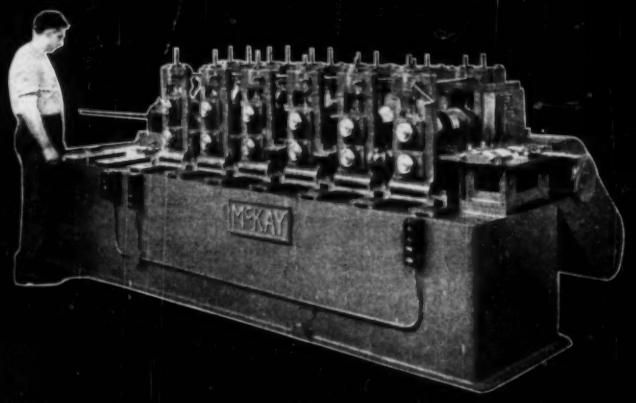
There's a McKAY Machine to Make Every Section



McKAY MICROMETER (patented)



REAR VIEW



STANDARD FEATURES

MICROMETER ADJUSTMENT. All pressure points on top shaft controlled by simple crank motion, through worm and gear reduction. Top shaft is ALWAYS PARALLEL. Micrometer dial furnishes visible check on roll pressures.

TYPICAL RUGGED McKAY CONSTRUCTION. Standardized units, choice of gearing, anti-friction bearings throughout, all gears between bearings. NOT OVERHUNG.

INTERCHANGEABLE GUIDING EQUIPMENT, easily adjusted, quickly removable.

MINIMUM CHANGEOVER TIME. All units engineered to allow complete roll change in shortest possible time.

LOW MAINTENANCE COST. All of the foregoing features, plus precision workmanship and up to the minute engineering, are a guarantee of low maintenance.

OPTIONAL FEATURES

BASE EXTENSION. Permits increasing the number of roll passes to meet future requirements, by the addition of standard housing units at a later date.

MOTOR DRIVEN COOLANT PUMP. Supplies flushing fluid to the rolls at each roll pass, and provides a rust preventative treatment to the formed strip. Tanks for fluid are built integral with the welded steel base.

ENGINEERS AND MANUFACTURERS OF
TUBE MILLS
USING
ELECTRIC RESISTANCE WELD
OXY-ACETYLENE WELD
ATOMIC HYDROGEN WELD

The **McKAY MACHINE** *Company*
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

PERFORMANCE RUGGEDNESS PRECISION AND SAFETY.

How Republic Metallurgical Service

smoothed out a burnishing problem

Jan. 26 Republic Field Service gets trouble call at 10 a.m.

Jan. 26 Union Drawn Machining Specialist contacts customer at 1 p.m. same day. Learns of difficulty in burnishing reamed hole, sketches suggested tool to give 5 to 10 micro-finish.

Feb. 2 Union Drawn Machining Specialist calls back to check tool drawings; makes corrections.

Feb. 23 Another call to check tool progress finds it almost completed.

Mar. 1 Union Drawn Machining Specialist checks alignment of burnishing tool on six-spindle automatic. Suggests set-up changes.

Mar. 8 On call from customer, Union Drawn Field Man checks burnisher operation; spots construction fault; makes on-the-spot correction. Parts come off as predicted – burnished finish is under 10 micro-inches. He stays on job until late that night.

Mar. 9 Union Drawn Man returns to see if any difficulty has occurred. Finds job running smoothly, with machine efficiency greatly increased.

from problem

to production—

6 WEEKS!

● This Union Drawn Steel customer needed volume production of automatic transmission parts . . . needed it fast. Specifications called for a 40 to 60 micro-inch finish on a two-step internal bore, machined from Union Cold Drawn B-1113 2⅛" round bar stock.

Inability to hold the finish below 100 micro-inches caused difficulty. So, a rush call went out for Republic Metallurgical assistance.

A Union Drawn Machining Specialist looked over the job, and designed a new broaching fixture and head. According to the customer's latest report, "we are now running this job from 2 to 20 micro-inch finish . . . production has increased about 18%."

Need help on any steel machining problem of your own? You'll get it promptly from "MACHINABILITY Headquarters." Just write:

REPUBLIC STEEL CORPORATION
Union Drawn Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic UNION® COLD DRAWN STEELS

REPUBLIC STEEL

Free-Machining Bessemer, Alloy and Enduro Stainless Steels • • Union Cold Drawn Special Sections
Union Cold Drawn and Ground Rounds; Turned and Polished Rounds; and Turned, Ground and Polished Rounds (Union Precision Shafting)

Decontrol: When, How?

NPA is cautious, says when possible, it will come "item by item"

WILL material controls ever end? If so, how?

No widespread decontrol for steel, copper or aluminum products is yet in sight, but manufacturers nevertheless press for more specific answers to those two questions from government agencies. They have won from NPA the cautious comment that when some decontrol is possible it will be accomplished "item by item—no general relaxation." Here are some of the arguments used by various segments of industry to convince NPA of the need for decontrol:

Tailor-Made—The High Alloy Steel Castings Industry Advisory Committee recommends that its products be removed from CMP because high alloy steel castings are tailor-made to specifications supplied by purchasers and so are unlike steel rolling mill products and other items which are on the list of controlled materials.

Controls maintained through the NPA "melt sheet" system and through allocation of scarce alloying materials are sufficient to apply to high alloy steel castings, the committee claims. By examining proposed steel meltings submitted monthly by steel producers, NPA can approve, reject or modify the use of scarce alloys.

Similar Reasoning—The Steel Products Industry Advisory Committee uses much the same line of argument for modifications of controls on stainless steel and tool steels. It wants them removed from CMP but to remain under M-80, which covers alloys, and through control of melting schedules, as with high alloy castings.

Committee members point out that orders on the mills for chromium stainless steels for the fourth quarter of 1951 and first quarter of 1952 are far below capacity, and some mills are running only part time on that production. A parallel situation exists in tool steels.

Textile Machinery Plants Switch

Almost all textile machinery manufacturers have converted to production of machine tools or other defense work, says the Textile Manufacturers Industry Advisory Committee to NPA.

Only about 10 per cent of all the textile machinery makers have adequate facilities to make machine tools, says the committee.

RECORD RECORDERS: The Pittsburgh Steamship Co. ends a record ore-carrying season (Dec. 14) as the steamers *Thomas F. Lynch* and *D. M. Clemson* are unloaded at Conneaut, O. Setting a new record for the company's 50-year history, the Pittsburgh fleet hauled 26 million gross tons of ore to furnaces and stockpiles on the lower lakes in 1951 season

How Are Nonessential Producers Doing? Badly, Say Six

HOW ARE NONESSENTIAL producers making out in our dual economy? In reports to NPA, here is what six civilian industries say:

Baby Carriages—Baby carriage manufacturers warn of a minor domestic crisis. With a record number of new customers arriving every month, baby carriage producers say they'll have to cut output 40 per cent or more in the next quarter. The standard carriage requires about 25 to 30 pounds of steel, mostly hot-rolled strip. The industry estimates that first quarter allotments of controlled materials would lead to layoffs of 30 per cent of its 12,000 workers.

Watch Cases—Watch case makers are annoyed. They can't get critical materials, but their foreign competitors can and are shipping watch cases into the U. S. in increasing volume. Domestic manufacturers say that competition from France, Japan and Germany will force them out of production of waterproof cases within six months. They estimate that from 40,000 to 60,000 pounds of materials, including stainless steel and copper-base alloy, would be required to produce 1 million watch cases.

Pianos—Asserting that their first quarter, 1952, allotments are out of tune with the piano's place in American life, piano manufacturers request a change in essentiality rating and the level of allotments made for pianos during the next three months. The industry points out that radios and television receivers have higher ranking than pianos.

Pens and Pencils—Layoffs of 20 to 40 per cent of 22,000 employees during the first quarter are anticipated as a result of curtailed allotments of controlled materials for fountain pen and mechanical pencil production. For the next three months the industry will get 89 tons of carbon steel, 2 tons of alloy steel, 68,287 pounds of stainless steel, 619,000 pounds of brass mill products and 18,469 pounds of aluminum.

Band Instruments—Employment will also drop in the band instrument industry because of reduced materials allotments. The industry's 41 firms employed 3000 one year ago, hires 2350 now and expects to drop to 2100 in the next three months. The only defense work of consequence: Band instruments for the armed services.

Lawn Mowers—Manufacturers of lawn mowers say that allocations of materials to makers of 1 and 1½-horsepower gas engines is not consistent with allocations for power lawn mowers which use about 70 per cent of the total production of the gas engines. Consequently, some power mower production has been lost. The lawn mower industry's 150 firms employ between 8000 and 9000 workers. From August, 1950, through July, 1951, the industry produced 3.5 million units, of which 1,250,000 were powered with either electric or gasoline motors. Prewar production of power mowers was 41,000 units yearly.

Europe . . . Big Production and Faster Rearmament in 1952

Western Europe reconstructed and expanded its productive capacity in almost every field in 1951, but fell short of goals. More of them will be reached in 1952

With the impetus of world-wide rearmament programs, European industry made a good recovery in 1951. Emphasis should shift from reconstruction to rearmament next year, though competition will be keener for raw materials and export markets.

EUROPE in 1951 recouped losses of prewar production levels, but not without considerable strains and stresses. The Korean war moved the European goal beyond simply reconstruction to reconstruction and rearmament. A plus factor adding to the demands on production was the sharpening of competition for export markets between European countries. There just weren't enough raw materials, or steel, to go around.

Output of steel throughout the world in 1951 was the highest ever, attaining nearly 230 million net tons, compared with 209 million tons in 1950, an increase of about 10 per cent. Europe, exclusive of the U.S.S.R., produced about 73.9 million net tons of crude steel, compared with 68.2 million tons in 1950, an increase of 8.65 per cent. The increase of steel output in Europe was general, apart from Great Britain, whose production dropped by about one million tons.

Abnormal Demand—Still, the shortage of steel, due mainly to the abnormal demand, was a feature of the year for the consuming industries of many European countries. Certain countries, such as Belgium and Luxemburg, intensified their production to meet the demand from other countries, to which more than half of the output of the Belux Union was exported. The shortage of steel was even more acute in countries such as Great Britain and France, which, despite their own domestic requirements, strove to export their products to ease their balance of payments and maintain their markets in the face of increasing competition.

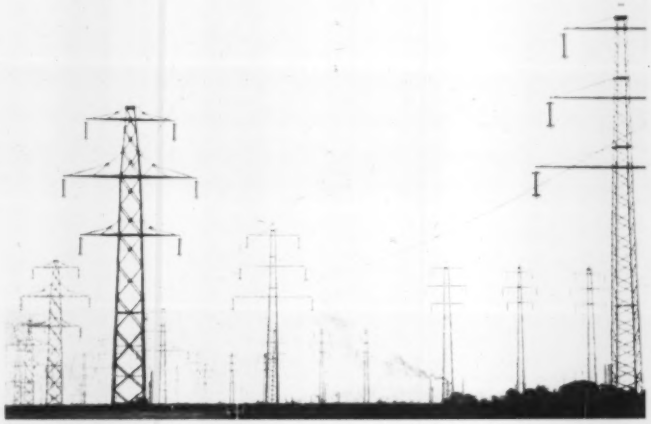
In most countries of Europe the rate of industrial production increased in practically every field: Automobiles, building, shipbuilding, machine tools, engineering machinery, public works, etc. The capacity of production of the principal producing countries—Great Britain, France, Belgium and Western Germany—could allow for a still higher output than was achieved, but there were other shortages in the fields of coal, scrap and, in some cases, iron ore. Difficulties were also experienced in regard to getting alloying elements. A shortage of manpower was a further handicap.

During 1951 considerable progress was made in the expansion and modernization of European industry. For example, the integrated iron and steel works of the Steel Co. of Wales, Ltd., at Margam, approached completion with some divisions already in operation. Two modern continuous strip mills, one in Belgium and one in France came into full operation. Modernization of automobile manufacture took place in Italy. France greatly expanded its output of hydroelectric power. Machine tool expansion occured in Germany and Switzerland.

Trade With U. S.—Trade between the United States and Europe attained a considerable volume in 1951. Owing to the shortage of coal which is a special handicap to industry in Western Europe, considerable tonnages of American coal were imported on the Continent. France alone has purchased American coal to the tune of over 3.5 million tons per year. One of the first steps of the new conservative government in Great Britain was approaching the United States for arranging coal deliveries in 1952. Negotiations are being carried on for the purchase of steel, too, from the U. S. American plant and equipment was shipped to equip and modernize continental works through the assistance of Marshall aid. Conversely, large tonnages of diverse iron and steel products have been exported from the Continent to the U. S., the Belux Union alone being responsible for shipments exceeding 500,000 tons.

The Schuman Plan still has to be ratified by the parliaments of five of the six nations concerned. It is unlikely that the treaty will be ratified by the parliaments of France, Belgium, Luxemburg and Western Germany without serious amendments. Any such amendments would have to be discussed by a committee of experts representing the various participating countries. It is therefore improbable that the plan will come into operation by the end of 1952.

The Economic Cooperation Administration (ECA) was abolished on Dec. 30, 1951, and replaced by the Mutual Security Agency (MSA). The effect of this change will be that



PATTERN OF POWER: Steel masts support the high tension wires of one of Europe's largest power transmission lines from Goldenberg (near Cologne) power station. About 600,000 kw are transmitted daily. France, too, greatly expanded hydroelectric plant this year

plant and equipment and parts supplied by the U. S. to the O.E.E.C. countries under the Marshall Plan, will in the future be directed toward rearmament programs, only in exceptional cases toward economic aid.

It Can't Go On—The position at year's end was difficult. Great Britain, France and Western Germany had accumulated a large adverse balance of payments, while Belgium came up on the credit side. This situation menaced the equilibrium of the E.P.U. "clearing house" system. It also caused Great Britain and France to take stringent measures to reduce their imports from America, and from each other, while the Belux Union had to restrict its sales to other E.P.U. countries.

It remains to be seen how this position will be met early in 1952, since these imbalances cannot be tolerated for long.

Great Britain—Great Britain has probably been more adversely affected by shortages than any other country in western Europe, particularly in regard to coal, steel scrap, steel products and manpower. In October the new Tory government took drastic steps to reduce annual imports from countries outside the sterling area by $980 million, of which $448 million will apply to imports of food. Essential raw materials are not likely to be much affected by this cut. A slowing down of strategic stockpiling is provided for, though the government stated that this would not affect the defense program.

France—The economic union with the Saar territory strengthens the position of France. Combined output of steel of France and the Saar, at the present rate of about 14.5 million net tons per year, gives third place in Europe to this combination, after Britain and Germany. The new and modernized steelworks begun under the Monnet Plan is beginning to achieve results and is expected to come to complete fruition about 1953. The export trade of the Franco-Saar union has increased considerably too, and for iron and steel products this union comes close behind the Belux Union, largest exporters in Europe.

NEW MODEL—GERMAN STYLE: The new model of the German Auto Union DKW coupe has a cruising speed of 60 miles an hour with a gas consumption of 43 miles to a gallon. The DKW is a popular small car and is powered by an engine featuring reverse scavenging and flat pistons

West Germany—West Germany made great strides forward during 1951. German exports increased materially, not only for steel products but also for manufactured goods. German automobiles can now be seen all over Europe, and occasionally even on British roads. German firms are again strong competitors in world markets in many engineering fields.

The Iron Curtain—The meager information seeping through the Iron Curtain suggests considerable activities in metalworking, among other things. Estimates of Russian iron and steel production show an increase of 2 million net tons for pig iron and 3 million tons for steel over 1950. According to official statements from the planning committee of the U.S.S.R., the total volume of industrial production at the end of the fourth 5-year plan, 1946-50, generally exceeded the target and the plan is stated to have been reached in four and a quarter years.

On the other hand, the output of iron and steel, and more particularly of rolled products, is not yet sufficient to cover the requirements of the country. New integrated steelworks are coming into operation in Czechoslovakia and engineering products are being exported to the western countries as well as to Russia.

An automobile industry is being developed in Poland. In Hungary, the new works of Dunapentele in the Danube valley started producing pig iron at the end of the year; the ore is imported from the Soviet Union. By 1954, Hungary plans to produce 2 million tons of steel per year.

STEEL's series on the economic pasts, presents and futures of the major Western European countries is concluded here with a summary of the general situation. The series was prepared by STEEL's European staff headed by Vincent Delport. J. A. Horton gathered material for the article on Great Britain and Herbert Gross prepared the German summary which both appeared on Dec. 24. The Dec. 17 articles were prepared by Leon Jaudoin for France and Jacques Foulon for Belgium. Erik Hook made the analysis of Sweden and Dr. Mario d'Onofrio the analysis of Italy in the Dec. 10 issue. Complete iron and steel statistics for all industrial nations of the world will be carried in the 1951 Metalworking Yearbook issue Jan. 7.

Transformer Men Protest

Manufacturers of power and distribution transformers will operate at only about 65 per cent of their plant capacity because of insufficient first quarter 1952 allotments of controlled materials, particularly copper wire mill products.

The manufacturers say their order backlogs average about 14 months for most transformers and from 18 to 24 months for large power transformers. Because of first quarter allotments, which are smaller than those made in the previous quarter, the manufacturers say their delivery schedules will fall behind three to four more weeks by March.

The manufacturers say their allotments are lower than those of engine and turbine producers, who reportedly are working at full capacity. That factor will cause the heavy power program to bog down, some industry members say, because power transformers are essential components in generating equipment.

Installation of electric power generating capacity is scheduled to increase about 42 per cent in 1952 over the 1951 level, which would increase the demand for transformers.

EVOLUTION.....
FIRST JIGS *then*
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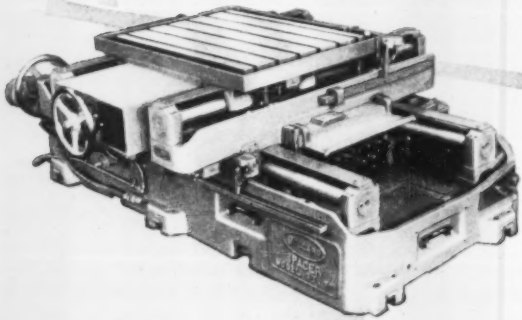

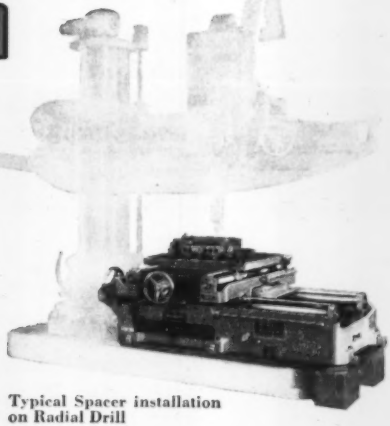

Typical Spacer installation on Radial Drill

For Higher Degrees of Accuracy, the Spacer is installed on Cincinnati Super Service fixed arm Drill

Jigs and templates are the old original means of repetitive production of a pattern of accurately spaced holes.

Today, through Evolution and Engineering Skill, Bullard has developed a FASTER, more Accurate and LESS COSTLY Method for this type of work.

Interchangeability of parts in small quantities at minimum cost is most important in modern manufacturing.

NO TIME REQUIRED FOR: —

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NO OPERATOR FATIGUE in locating and relocating of Drill Arm. See further comparisons in Spacer catalog.

When writing, mention "EVOLUTION".

THE BULLARD CO.

BRIDGEPORT 2, CONNECTICUT

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

To its embarrassment, National Automobile Dealers Association finances a poll and finds that many people don't like and don't trust auto dealers

WHAT do you think of automobile dealers? This was the question which the National Automobile Dealers Association wanted the answer to when it commissioned the public opinion research firm of Elmo Roper for a nation-wide survey.

Eye-opener—What NADA found out opened its eyes. Public relations-conscious to a high degree—it last month won the American Public Relations Association's highest award for its car "essentiality" campaign—the dealers' organization found out that the public has anything but a high regard for car sellers. Sixty-eight per cent of the 3112 people interviewed had one or the other of these views: "While some new car dealers are fine men and do a good job, you have to watch when dealing with a good many of them;" or "the whole system of selling new cars is bad and needs a great many changes." Fifty-one per cent said the first statement best expresses their views, and 17 per cent went along with the second. Only 24 per cent said: "Most new car dealers are fine businessmen and do a good job of serving customers."

Given a choice of the kind of businessman that a newcomer to a town could trust to "treat you fairly and squarely," the new car dealer came last, only 2 per cent choosing him over the druggist, insurance agent, lawyer and real estate agent.

A Matter of Age—Almost worse than these answers from the car dealer's standpoint is the fact, revealed by the survey, that the distrust is greater as age of the respondent decreases. Minimum age queried was 21, and in the 21-34 age bracket 35 per cent of the interviewees expected car dealers to take advantage of them. This contrasted with 31 per cent in the 35-49 age group and 22 per cent in the over-50 group. The group which has the lowest opinion is the same one on which the dealers must depend for much of their future business.

In virtually every section of the survey, the answers came back that dealers as a whole exploit the public. Present car prices, 57 per cent of the public believes, are too high—"Someone is making more profits on them than they should." New car dealers were blamed for this 23 per cent of the time, while 12 per cent blamed the manufacturer and 14 per cent blamed both. Car owners are more distrustful of dealers than non-owners.

A Matter of Income—People in top economic brackets have most faith in dealers, and the lowest opinion of them is held by folks in the next-to-lowest income brackets. In car repair work it was found that only about half of the respondents patronize a dealer. Best showing for new car dealers was over their used-car operations. Thirty-five per cent of potential used-car buyers said they would prefer to buy from a new-car dealer, 18 per cent chose the private individual who would be selling his own car, and 8 per cent favored the used-car dealer. To 26 per cent "it wouldn't make any difference."

NADA professes that it was seeking criticisms and misconceptions when it had the survey undertaken "because such misconceptions need correcting and such criticisms, if they be found justified, demand action." However, it appears not over-eager to have the survey finds publicized. Normally candid and open in its dealings with the press, NADA this time did not put the foregoing information out in press release form, as would be customary. As far as can be determined only one independent automotive trade publication whose editor wrote NADA for the survey findings was given the information a few days in advance of the distribution of NADA's magazine to its members. It was from NADA's magazine that the above was summarized.

Auto Men Hedge for Steel Strike

Coming to the reluctant conclusion that a steel strike could happen on Jan. 1, automakers, purchasing agents and follow-up men suddenly went to work a few days before Christmas to find out how

SOLD AT SEARS: The 1952 Allstate automobile was introduced by Sears, Roebuck & Co. The Allstate is available in four and six cylinder models. Features include low initial cost, high fuel economy, good maneuverability and high horsepower-to-weight ratio

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their suppliers are fixed, steelwise. Regardless of the on-the-surface belief these men have that they can get through a short-lived strike, many will admit that in spite of careful checking it only takes one insignificant part to halt a production line, and the living has been too much hand-to-mouth to feel any optimism in case the strike does take place.

Very few distress calls have been heard from steel users around Detroit. A fairly common complaint both from sellers and consumers, however, is that the present CMP allotments are not large enough to permit buying all the steel which is available.

Spot check of warehouses reveals that many flat-rolled items, galvanized excluded but including plate, are in adequate—in some cases abundant—supply for present CMP-controlled demand. The bar situation is not so good, but no longer is termed "critical" by most users or sellers. Even structural steel supply is held by a few warehouses in excess of demand.

Elaborate Wayne Lab Planned

Two members of the auto industry have pledged $200,000 to Wayne University, Detroit, for equippage and operation of its computer laboratory. General Motors has promised $150,000 for purchase of a digital computer, to be the first of its kind in the midwest, and Ford's grant for $50,000 is to cover operating costs of the laboratory. Third contributor is Burroughs Adding Machine Co. which will build the massive piece of equipment at cost.

The computer laboratory expansion is being set up as a "five-year plan" to cost a total of $400,000. Grants are being sought from other companies which can make use of the equipment for complex industrial mathematical problems for the remaining $200,000 needed for operating expenses.

The value of such a completely equipped laboratory is two-fold. It will provide a training ground for operators, of which there are very few at present, and will permit research for industry into problems which heretofore were impractical or impossible of solution by ordinary computing machine and manpower methods. Many such problems have plagued the auto industry, and have required trial and error methods which were wasteful at best and quite frequently failed to give the optimum answers as well.

Source of pride to Prof. Arvid W. Jacobson who is in charge of the laboratory is the fact that it is the first endeavor of its kind to have no government support. Private funds will enable the machine to be used on industrial problems. Other digital computers are said to be so heavily booked with government work that no one else can get near them.

Auto, Truck Output
U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,847
October	548,350*	796,010
November	480,323*	833,784
December		671,622

Week Ended	1951	1950
Dec. 1	119,962	152,107
Dec. 8	116,932	162,757
Dec. 15	115,627	172,307
Dec. 22	108,172	161,033
Dec. 29	61,000	135,229

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Chrysler Assembles First Tank

First tank has lumbered out of Chrysler Corp.'s Newark, Del., tank plant. The pilot model, however, was only assembled there from parts manufactured at Detroit's Tank Arsenal. Nevertheless, the achievement is notable. The tank was completed less than eleven months after Chrysler received the defense contract and broke ground for the facility.

Of entirely new design, a joint Chrysler - Ordnance undertaking, this tank is a heavy, and, according to Army Ordnance officers, "will out-slug any land fighting machine ever built." Details remain in the restricted category, but it is reported the tank mounts a 120-mm cannon.

Robert T. Keller, general manager of the Delaware facility, says that the exact date for the tank to go into volume production cannot be disclosed. He adds, however, that construction of the plant is more than a month ahead of schedule. Commenting on the machine tool situation, he says they "are more difficult to get but every effort is being made to meet all schedules, and we expect to do so."

All major construction on the 900,000 square foot main manufacturing building, boiler plant and test track has been completed and these facilities are in use. Office building, paint and repair shops are well on the way to completion. Employment presently is 650, and will reach about 3000 when contemplated volume is achieved.

Main use of the plant will be for mediums, Chrysler's contract for heavies being of a development nature at this point, not production.

Studebaker Drops Airplane Look

The airplane motif, introduced with 1950 models and subdued somewhat in 1951s, has been abandoned by Studebaker on its '52s. The "Spinner" nose, which provided a convenient mounting for a small propellor, gives way to a more conventional grille treatment. It strikes a distinctive note by "wrapping around" the front fenders to follow the bumper line. Other exterior changes in the new models include a longer and more sharply sloping hood, redesigned headlight rims and tail light housings and stainless steel gravel shields on several models. Glare and heat-reducing glass is offered as optional in all models, and the convertible model makes use of the new "Orlon" acrylic fiber for its top.

Studebaker's big news for 1952, however, is inclusion in its line of a five-passenger hardtop convertible which is offered in both the Commander and Champion lines. Called the "Starliner," this model achieves the distinctive appearance which only its convertibles have previously had by keeping a long sweep from the top to the trunk lid.

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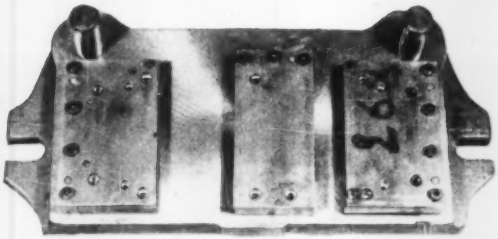
Detroit, Michigan

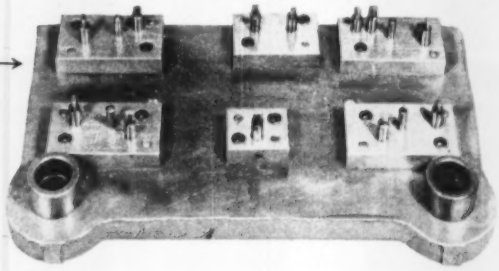
3104 Smith Tower
Seattle, Washington

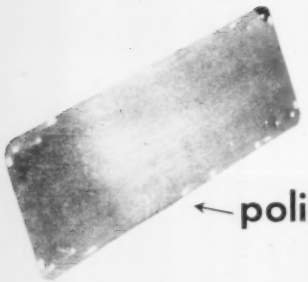
Monadnock Building
San Francisco 5, California

Die repairs eliminated →



punch life increased →





← polishing of stampings no longer needed

. . . with dies made of Graph-Mo steel

STAMPING out stainless steel parts for medical sterilizers was causing trouble for the Pelton & Crane Company, Detroit. The dies they were using—made of an ordinary tool steel—became worn after only a few hundred stampings. Holes in the parts were ragged, requiring polishing. The punches were continually chipping and cracking.

They then tried dies made of Graph-Mo—one of four Timken® graphitic tool steels. After 12,000 stampings, the Graph-Mo dies still showed no signs of wear. Stampings were clean and smooth. No polishing was needed. Pelton & Crane reports: "The fact that Graph-Mo stands up on stainless steel, where other types we used continually broke down, leads us to believe there is no finer tool steel on the market today than Graph-Mo."

Graph-Mo offers many advantages in dies and punches. Because of free graphite in its structure, Graph-Mo has minimum tendency to scuff or gall. Because it contains diamond-hard carbides, it offers unusual resistance to wear. Graph-Mo has excellent stability. Surfaces may be finished to precision tolerances. Machining is far easier than with ordinary tool steels. And Graph-Mo's uniform response to heat treatment prevents distortion in hardening.

For further information, write on your company letterhead for new, 10th edition of Timken Graphitic Steel Data Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

The Business Trend

The economy took some unexpected turns in 1951 that will affect '52 business. Holiday takes greater-than-normal toll in industrial production

ECONOMIC LESSONS learned in 1951 are tempering 1952 business forecasts. Several unexpected turns were taken in 1951 by our garrison economy.

Two bulwarks of business, of course, were capital expansion by industry and defense spending. Plant-equipment spending for the year was about 35 per cent above 1950. Defense spending in the year took 11 per cent of all production, compared with 7 per cent in 1950. Personal income ($250 billion) and spending ($205 billion) were well above 1950.

Most unexpected business turns of the year were the sharp slump in civilian business and heavy inventory accumulation on all levels of distribution. Rate of personal savings in the year was about double the normal average. Prices, retail and wholesale, rose only moderately. Homebuilding exceeded by about 200,000 units the total thought possible a year ago. Auto output, though lower than 1950's record, was still the second-best total on record. Business profits after taxes were down nearly one-fifth from 1950; before taxes they were at a new high.

On the current industrial scene, there was little business-as-usual through the holidays. The total on output is still being tabulated, but STEEL's index of industrial production pointed the downward trend in the week ended Dec. 22. The index (1936-1939=100) dipped four points in that week to a reading of 213, and preliminary reports indicate a slump below the 200 mark in the Christmas week.

Automakers Ready New Models..

The new year's first weeks will see a spurt in auto assemblies. Some producers gave extended vacations to employees during the holidays as plants were shut down for inventory and model changeover. Slowdowns to keep from piercing the ceiling on unit assemblies and severe winter weather played a big part in depressing completions in the week preceding Christmas. *Ward's Automotive Reports* estimates passenger car and truck assemblies in U. S. and Canadian plants at 108,172 units in the week ended Dec. 22. That's down over 7000 units in the week and about 53,000 less than year-ago turnout. Auto production for the year is down about 19 per cent, says *Ward's* but truck volume is 7 per cent ahead of 1950.

No Holiday for Steel Mills . . .

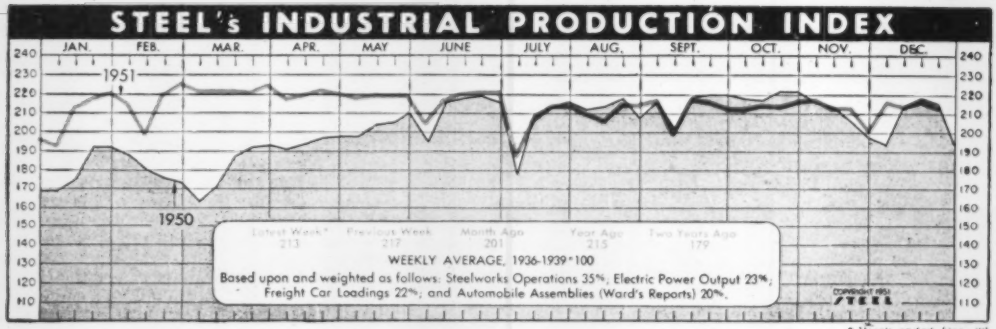
More than 200 tons of steel a minute flowed from the nation's steelmaking furnaces throughout 1951. For the first time in history the industry operated at an average slightly over rated capacity. Even in the Christmas week the mills slowed but little. American Iron & Steel Institute calculated operations in the week ended Dec. 29 would yield 2,027,000 tons, down 70,000 tons from the all-time high recorded the previous week.

Buyers See Business Slide . . .

December business conditions haven't been encouraging, says National Association of Purchasing Agents'

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	104.5	104.0	103.0	101.5
	Electric Power Distributed (million kilowatt hours)	7,650	7,667	7,157	7,033
	Bituminous Coal Production (daily av.—1000 tons)	1,893	1,865	1,918	2,032
	Petroleum Production (daily av.—1000 bbl)	6,210	6,225	6,232	5,805
	Construction Volume (ENR—Unit $1,000,000)	$139.0	$192.6	$163.1	$692.0
	Automobile and Truck Output (Ward's—number units)	108,172	115,627	86,313	161,033
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	730†	753	711	747
	Business Failures (Dun & Bradstreet, number)	160	143	149	174
	Currency in Circulation (in millions of dollars)‡	$29,263	$29,037	$28,701	$27,929
	Department Store Sales (changes from like wk. a yr. ago)‡	−4%	−1%	+2%	+9%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—million)	$20,265	$16,492	$18,828	$18,247
	Federal Gross Debt (billions)	$259.4	$259.4	$258.1	$256.7
	Bond Volume, NYSE (millions)	$15.3	$14.0	$11.1	$32.6
	Stocks Sales, NYSE (thousands of shares)	7,061	7,144	4,942	17,372
	Loans and Investments (billions)†	$73.8	$73.1	$72.5	$70.3
	United States Gov't. Obligations Held (millions)†	$32.1	$31.9	$31,457	$33.4
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	167.67
	STEEL's Nonferrous Metal Price Index‡	234.9	234.9	234.9	246.9
	All Commodities†	177.1	177.1	177.2	175.8
	Metals and Metal Products†	190.9	190.9	190.9	185.1
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 213
Previous Week 217
Month Ago 201
Year Ago 215
Two Years Ago 179
WEEKLY AVERAGE, 1936-1939*100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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* Week ended Dec. 22

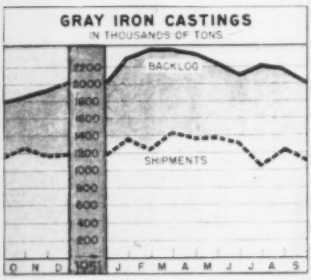
Business Survey Committee. It says the trend to lower industrial activity reported in November has continued, and the decline is much more pronounced. New orders took a sharp drop; lower backlogs were reported by the largest number of members since summer. The agents note the decline in new business comes in the face of continued price strength and the portent of more to come—from Capehart formula pricing and steel wage negotiations. Inventories are lower and buying policy is predominantly within the 90-day range. Consensus of buyers is that civilian production, to which the industrial economy is still predominantly geared, will be low for the first quarter of 1952—much lower than during 1951's first quarter. Defense production will increase substantially, but volume will not be large enough, nor can it be spread wide enough, to cover the bare spots now developing and which are expected to show up in early 1952.

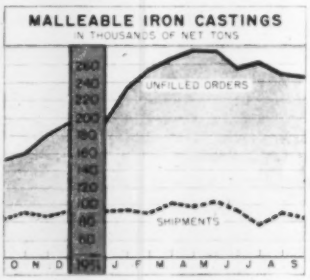
Construction Tops '50 . . .

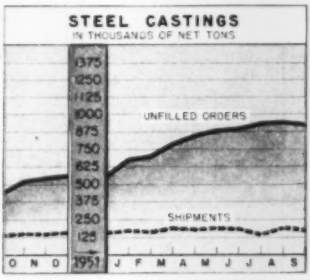
With one more month's construction contract awards still to be tallied, the year 1951 topped the previous record 12-month total set in 1950 by nearly $16 million, says F. W. Dodge Corp. in checking its totals for 37 eastern states. Awards in eleven months reached $14,516,792, says the construction news firm. November awards—$931,768,000—were 11 per cent less than October and 14 per cent below November, 1950. *Engineering News-Record* reports industrial construction for 51 weeks of the year at $4,072.6 million, up 145 per cent over the same period in 1950.

Toolbuilders Speed Shipments . .

Speed of rearmament is closely correlated with machine tool production, and latest National Machine Tool Builders Association figures show that industry speeded its pace







Gray Iron Castings
Thousands of Net Tons

	Shipments 1951	Shipments 1950	Backlogs* 1951	Backlogs* 1950
Jan.	1,364	913	2,298	914
Feb.	1,234	864	2,392	873
Mar.	1,440	996	2,390	922
Apr.	1,363	981	2,337	922
May	1,396	1,095	2,229	978
June	1,309	1,136	2,162	1,040
July	1,029	961	2,208	1,287
Aug.	1,219	1,202	2,145	1,670
Sept.	1,115	1,159	2,055	1,794
Oct.	1,303	1,255	1,991	1,840
Nov.		1,161		1,930
Dec.		1,182		2,012
Total		12,905		

*For sale. U. S. Bureau of the Census.

Malleable Iron Castings
Thousands of Net Tons

	Shipments 1951	Shipments 1950	Unfilled Orders* 1951	Unfilled Orders* 1950
Jan.	92.5	62.9	234	62
Feb.	89.0	60.4	255	67
Mar.	101.7	66.3	267	70
Apr.	97.3	69.8	276	76
May	100.8	76.2	275	77
June	93.7	82.3	256	87
July	76.8	67.5	263	105
Aug.	90.7	86.0	249	132
Sept.	82.3	82.5	245	153
Oct.	92.4	90.0	230	160
Nov.		85.2		180
Dec.		91.5		195
Total		920.6		

* For sale. U.S. Bureau of the Census.

Steel Castings
Thousands of Net Tons

	Shipments 1951	Shipments 1950	Unfilled Orders* 1951	Unfilled Orders* 1950
Jan.	174.1	89.1	675.4	142.5
Feb.	164.0	91.8	707.4	165.2
Mar.	190.7	111.8	779.7	185.6
Apr.	181.9	107.0	846.9	201.6
May	189.2	117.9	881.7	198.0
June	184.7	131.1	895.1	206.8
July	147.2	98.3	930.0	255.4
Aug.	177.1	128.4	944.2	239.9
Sept.	160.7	134.6	918.0	428.0
Oct.	189.9	149.6	891.5	521.8
Nov.		145.9		537.7
Dec.		155.3		554.2

*For sale. U. S. Bureau of the Census.

Charts—Copyright 1951, STEEL

slightly in November after a sensational spurt in October. Index of metal-cutting types (1945-1947=100) shows shipments rose from 221.3 to 225.7, while new orders fell from 403.9 to 332.6. Ratio of unfilled orders to demonstrated production rate going into December was 20.8 to 1, a slight drop from the month before.

Labor Market Loosens . . .

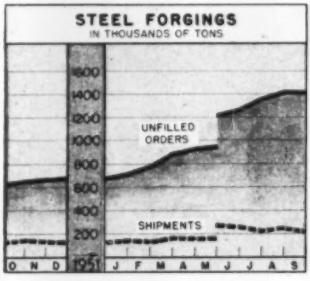
Loosening labor market—a normal yearend pattern—is noticeable again, and unemployment is slightly higher than it was a year ago. Latest employment statistics of the Labor Department, showed a decline of 100,000 between mid-October and mid-November. Total nonfarm employment, 46.7 million, remained at a record high for the season. Factory employment totaled 15.9 million in November, down by about 80,000 from the previous month, but aircraft, metalworking machinery and shipbuilding industries continued their workforce expansions. Industries producing industrial equipment and military goods account almost entirely for the 100,000 gain in factory employment recorded over the year. Total job placements by public employment service exceeded 15 million this year.

Trends Fore and Aft . . .

Number of residential gas customers reached the all-time high of 29,662,000 in 1951, says Louis Ruthenburg, president of Gas Appliance Manufacturers Association . . . 1951 was the most difficult year the television industry will ever have to face, says John S. Meck, president of Scott Radio Laboratories Inc. . . . November whoesale price index was 1 per cent below the January level . . . U. S. Chamber of Commerce says one-third of all federal, state and local government spending in fiscal 1950 went for some 300 public welfare programs . . . 800,000 people are now on the Bell telephone system waiting list . . . Industrial building costs at yearend held to the level established in 1951's first quarter, says Austin Co. . . . Total U. S. population on Nov. 1, 1951 was 155,356,000, reports the Census Bureau.

Issue Dates of other FACTS and FIGURES Published by STEEL:

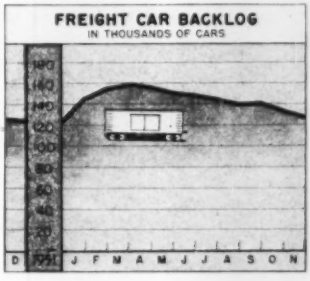
Construction Dec.10	Gear Sales Dec.17	Ranges, Gas Dec.24
Durable Goods Oct.8	Indus. Production ..Nov.19	Ranges, Elec. Dec.24
Employ., Metalwkg.Nov.12	Ironers Dec.17	Refrigerators Dec.24
Employ., Steel Dec.10	Machine Tools Dec.3	Steel Shipments ..Dec.17
Fab. Struc. Steel..Nov.12	Prices Nov.19	Vacuum Cleaners ..Dec.3
Foundry Equip. ...Dec.17	Pumps Dec.10	Wages, Metalwkg...Oct.22
Furnaces, Indus. ..Dec.10	Purchasing Power..Oct.8	Washers Dec.17
Furnaces, W. Air ..Dec.24	Radio, TV Dec.10	Water Heaters Dec.24



Steel Forgings
Thousands of Net Tons

	Shipments		Backlogs	
	1951	1950	1951	1950
Jan.	138	93	709	327
Feb.	129	93	781	341
Mar.	161	109	875	350
Apr.	154	99	924	357
May	266*	114	1,208*	373
June	249*	117	1,264*	408
July	220*	95	1,361*	446
Aug.	240*	124	1,436*	548
Sept.	225*	122	1,419*	620
Oct.	280*	137	1,427*	643
Nov.	...	130	...	657
Dec.	...	128	...	674

U. S. Bureau of the Census. *Data for these months based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more. Previous data based on reports from commercial forge shops producing 6600 tons or more per year.



Freight Car Awards and Backlogs

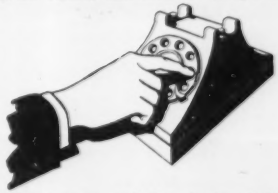
	Awards		Backlogs*	
	1951	1950	1951	1950
Jan.	26,356	9,376	144,758	19,026
Feb.	15,947	9,065	154,861	26,055
Mar.	11,271	6,201	158,619	30,539
Apr.	6,628	3,298	155,871	32,857
May	4,919	11,636	150,628	42,300
June	6,793	2,095	147,725	40,585
July	2,417	30,065	144,810	67,084
Aug.	1,828	23,850	139,014	86,136
Sept.	9,657	25,111	140,135	106,611
Oct.	3,464	21,886	132,792	122,148
Nov.	6,752	10,573	129,158	126,870
Dec.	....	3,326	.....	124,489
Total		156,482		

* End of month

American Railway Car Institute.

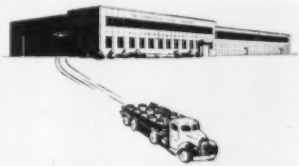
ONE RING FOR SPRING

(Flat rolled, annealed or tempered)



To assist you to find a single reliable source for a wide variety of annealed or tempered spring steels, Kenilworth established a specialized department. Here you will always find the usual as well as the unusual in finishes, types and sizes.

AND QUICK SERVICE



Because of the complete facilities of Kenilworth your order gets immediate and interested attention. So, when you desire trouble free fabrication and end-product quality, give Kenilworth a try—you'll get an accurate and fast answer on current "in stock" availabilities with subsequent quick processing of your order.

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LET'S TALK ABOUT ALL OF KENILWORTH'S SERVICE

Other Kenilworth flat rolled products include stainless sheets, tin-coated steel, shim steel, etc.—stocks vary from day to day—your inquiry will get immediate attention. Modern precision slitting and shearing equipment to handle your metals from .001" to .187"—in widths up to 36" is another Kenilworth service.

Thomas A Edison

Cuts Costs in Half with SPEED NUTS®

Edison specifies SPEED NUTS after cost comparisons reveal 50% savings over other militarily acceptable fastening methods.

In the very earliest design stages of their aircraft fire detection relay panel, engineers of Thomas A. Edison, Incorporated, checked various methods of attaching connectors to the panel.

Their requirements were rigid. The fastening means had to be light in weight, resist vibration loosening, provide quick and easy assembly, and be in line on cost. Tinnerman Aircraft Connector Mounting Rings proved to be the only fastener that qualified on all counts. Connectors are quickly inserted through these mounting rings and the panel.

As for cost, Tinnerman SPEED NUTS *turned in the finest record by far! Easily 50% assembly savings over acceptable military substitute fasteners were provided by faster, easier, better* SPEED NUTS. Complex or simple, solving fastening problems is Tinnerman's specialty. New booklet, "A Story of Quality", reveals how we can help you. Write for your copy. TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners Ltd., Hamilton. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales.

EDISON
Cut-away view of Edison Fire Detection Relay Panel, left, shows two SPEED NUT Connector Mounting Rings in position. "U" Type SPEED NUTS, self-retained on 4 corners of ring, line up with screws driven from outside panel. Detail drawing, below, is close-up of assembly.
TINNERMAN
Speed Nuts

Men of Industry

JAMES P. BACON
. . . heads sales, National Tube division

JOSEPH H. HUMBERSTONE
. . . a V. P. of Air Reduction

R. B. BLYTHE
. . . chief engineer, Aro Equipment factory

James P. Bacon was appointed manager of sales, tubing specialties division, for **National Tube Co.**, subsidiary, U. S. Steel Corp., Pittsburgh, replacing **Harry Bialock,** who resigned. Mr. Bacon was district representative in the tubing specialties division of the company in New York.

J. J. Nolan Jr., formerly executive vice president and a director, was elected president of **Central Foundry Co.,** New York. He succeeds **David Ford,** president since 1938, who becomes chairman of the board.

Arthur W. Bull was elected vice president in charge of engineering of **Michigan Wire Cloth Co.,** Detroit. He has been chief engineer of the company since 1947, and previously was project engineer at King-Seeley Corp.

Wladimir P. Lewicki was appointed works manager of **Southwest Steel Rolling Mills,** Los Angeles.

William G. Whyte was appointed assistant director of public relations, Chicago district, **United States Steel Co.** He succeeds **Paul Thixtun,** promoted to director of public relations for U. S. Steel at Louisville.

E. R. Ordway, associated with **Kaiser-Frazer Corp.** since 1946, was named general manager of the corporation's aircraft production on the West Coast. He will be in charge of the Oakland and Richmond, Calif., aircraft and machining divisions, respectively. Mr. Ordway succeeds **William Cannon,** now associated with Columbia Machine Works, Oakland. **Duncan Gregg** continues as works manager of the Richmond plant.

Joseph H. Humberstone was elected a vice president of **Air Reduction Co. Inc.,** New York. He was formerly president of the company's Airco Equipment Mfg. Division, and has been succeeded in that capacity by **Scott D. Baumer.**

Robert A. Graney was appointed to the newly created post of assistant general superintendent of **Inland Steel Co.'s** Indiana Harbor, Ind., works. He will be in charge of labor relations and training. Mr. Graney formerly was vice president in charge of industrial relations at Kaiser-Frazer Corp., and since December, 1950, was an industrial relations consultant on the West Coast.

Timken Roller Bearing Co. appointed **R. G. Wingerter** as assistant general manager, and **J. R. Splitstone** as district manager of its automotive sales division. Both men continue to make their headquarters at the company's general automotive sales division offices in Detroit.

Donald C. Howard was appointed factory representative for **New York Belting & Packing Co.** in California, Nevada and southern Oregon.

Heil Process Equipment Corp., manufacturer of chemical proof equipment, such as tank linings, anodes, heat exchangers, etc., appointed **Fred W. Arndt** as direct representative to cover the eastern states. His headquarters are in New York.

Norman E. Carlson was appointed assistant chief mechanical engineer, **American Car & Foundry Co.,** New York.

R. B. Blythe, former sales manager, aircraft division, **Aro Equipment Corp.,** Bryan, O., was made executive chief engineer of the Bryan factory, with responsibility for all engineering and experimental activities in aircraft products, pneumatic tools and lubricating equipment. **J. R. Markey** was appointed sales manager of the aircraft division. He previously served as a member of the aircraft sales division and the management committee.

John B. Astell & Co. Inc., New York, elected **H. L. Bialock** president. He formerly was manager of sales, tubing specialties division, National Tube Co., Gary, Ind., and Ellwood City, Pa. Other changes include: **John R. Astell,** chairman of the board; **Frank J. Heinzmann,** vice president; and **Edward J. Mogol,** secretary.

John W. Meader, economist for **Great Lakes Carbon Corp.,** New York, was elected assistant vice president of the corporation. Author of numerous articles on engineering and economic subjects, Mr. Meader served from 1941 to 1945 as consultant in the U. S. Bureau of Aeronautics in aircraft production, weapons development, and operations analysis.

Steel Products Warehouse Association, Cleveland, elected **Clayton Grandy,** vice president, Todd Steel Corp., Detroit, as president and chairman of the board. He was formerly president and executive secretary of the trade group from 1943 to 1949, when he joined the Todd Division of Century-America Corp.'s steel warehouse operations. Returning as president of the association, Mr. Grandy

succeeds **Maxwell Jospey**, Production Steel Co., Detroit, who has held the office during the past year.

P. D. Doran was promoted to chief, commercial sales, **Pratt & Whitney Aircraft,** division of United Aircraft Corp., East Hartford, Conn. He was chief, airlines engineering, a department which he was largely responsible for establishing at P&WA. He is succeeded in that position by **Frank W. DuLyn,** his former assistant.

Cecil Schwartz, stress analyst for Barnes & Reinecke Inc., Chicago, was named an associate engineer in the heat-power research department at **Armour Research Foundation,** Illinois Institute of Technology, Chicago. **Leonard L. Johnson** was appointed an associate engineer in the mechanism and propulsion research department; **John C. Lee,** an assistant engineer in the heat-power department; and **Richard P. Molt,** a research engineer in the structural research department.

At the Chicago Works of **Borg-Warner Corp.,** all contract and defense sales are now directed by **James H. Ingersoll,** vice president. Reporting to him will be **A. J. Robertson,** new manager of defense sales, and **L. R. Miller,** new manager of contract sales. Mr. Robertson was formerly assistant to the president, and Mr. Miller, assistant manager-contract sales.

Webster - Chicago Corp., Chicago, elected **Gus W. Wallin** to the newly created position of vice president in charge of engineering. Mr. Wallin formerly was with Motorola Inc. for 11 years, most recently in charge of its military engineering. **A. A. Gumz,** production manager of Webster-Chicago, was named a vice president, responsible for following through on all government orders. He has been with the company since 1943.

GUS W. WALLIN
. . . Webster-Chicago V. P.-engineering

G. B. DAVIS
Elected vice president-sales, Baker-Raulang Co., Cleveland. Noted in STEEL, Dec. 24 issue, p. 47

Roger D. McCutcheon was appointed sales representative of **Nichols Wire & Aluminum Co.** in the Chicago area to succeed **James D. Case,** appointed products manager of the company. Mr. McCutcheon formerly represented the company in New York.

Edward W. Hanson, for 33 years with **Sauer Inc.,** Pittsburgh, as an estimator and superintendent of construction, has retired.

William J. Brosch and **Jack Caylor** will handle sales for the **Brown Instruments Division,** Minneapolis-Honeywell Regulator Co., Minneapolis. **John Hopkins** will handle commercial, and **Donald Schmick,** heating controls divisions sales.

J. O. Eby was appointed Jeffrey Mine manager, Asbestos, Que., **Canadian Johns-Manville Co. Ltd.,** and general manager of the Asbestos Fibre Division. He succeeds **Karl V. Lindell** who became vice president of the Johns-Manville Canadian company in November.

H. H. Hanft was named assistant to the manager of the industrial department for **Westinghouse Electric Corp.,** Pittsburgh. He formerly was a section manager of the transportation sales department.

Edward A. Green was named manager of product planning of **General Electric Co.'s** small and medium motor department, Schenectady, N. Y. For the last 16 months he was stationed at Lynn, Mass., as staff assistant to the general sales manager of the company's former small apparatus division, and remains at Lynn for the time being. **Richard T. Walsh** was appointed superintendent of GE's chemical division's Coshocton, O., plant. **E. G. Staley Maxwell** was named manager of the Charleston, W. Va., apparatus sales office and **John H. Pharis Jr.** succeeds Mr. Maxwell as manager of the firm's Roanoke, Va., office.

American Can Co. shifted plant managers at two of its California operations. **L. E. Davis,** manager of the Sacramento plant since 1947, moves to the larger operation in San Francisco, exchanging places with **G. A. Kamena.**

Chelsea R. Phillips was named field engineer at Hibbing, Minn., by **Hewitt-Robins Inc.** He will set up and head the company's new office there.

John J. Reinecke was appointed executive secretary of **American Home Laundry Manufacturers' Association** with headquarters in Chicago.

Percy Skewes joined **Lowell Iron Foundry Inc.,** Lowell, Mass., as general manager.

H. Barden Allison was appointed district sales manager of the Philadelphia branch, mechanical goods division, **United States Rubber Co.** He succeeds **A. B. Means** who continues as sales adviser. Since 1947 Mr. Allison has been sales manager of the company's L. H. Gilmer Division.

Dr. A. Lloyd Taylor was appointed director of research in the research laboratories of **MacDermid Western Inc.,** Ferndale, Mich., where he will work in the field of industrial detergents, chiefly for use in the field of metals. He was formerly director of the department of chemistry of Pease Laboratories, New York; director of research for Oakite Products Inc.; and vice president in charge of research and development for H. L. Shaw & Sons Inc. More recently he held the

DR. A. LLOYD TAYLOR
. . . directs research, MacDermid Western

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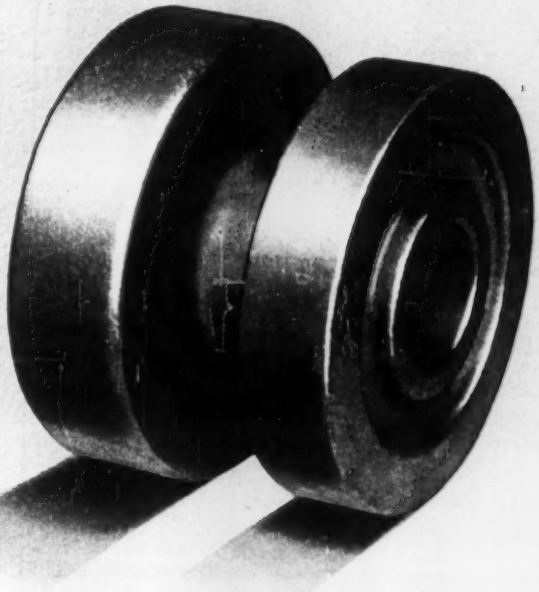
USUALLY COST LESS AT THE POINT OF ASSEMBLY

Cluster Gear forging, weight 28 lbs. This forging is 6" in diameter, 5" long; both ends are formed at one setup of the dies.



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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

J. C. WILLEY
. . . assists president, Harbison-Walker

HOWARD U. HERRICK
. . . new president of E. W. Bliss

JACKSON KEMPER
. . . Watson-Stillman div. sales mgr.

position of research supervisor for Wyandotte Chemicals Corp.

J. C. Willey was appointed assistant to the president of **Harbison-Walker Refractories Co.**, Pittsburgh. He has been associated with the company in a variety of operating and executive positions since 1934, and since 1947 has served as assistant to the vice president.

Robert J. Loskill was named manager of the sales training division, **Caterpillar Tractor Co.**, Peoria, Ill. **Thomas A. Glass** succeeds Mr. Loskill as assistant manager of the governmental division.

Industrial Truck Association, Philadelphia, elected **Walter E. Schirmer** its president for the ensuing year, and **Prentice Borden,** vice president. Mr. Schirmer is vice president of Clark Equipment Co., Buchanan, Mich., and Mr. Borden is general manager of Crescent Truck Co., Lebanon, Pa. **William Van C. Brandt** continues as managing director of the association.

Neil Currie Jr., general consultant for **General Electric Co.'s** manufacturing services division, Schenectady, N. Y., retired after 43 years of service with the company. In 1949 he became administrative assistant to the vice president and general manager of the apparatus department, in which position he served until February.

Howard U. Herrick was appointed president, **E. W. Bliss Co.**, Canton, O. Previously associated with Bliss from 1934 to 1944, he had retired from active participation in the press industry, and resided at Ft. Lauderdale, Fla. His offices are now located in the company's main plant at Canton. He succeeds **Louis C. Edgar Jr.**, who resigned in November as president.

Sundberg-Ferar, Detroit, industrial designer, announces that **Mary Ellen Green** has joined its staff of designers.

Dr. Lauriston C. Marshall was appointed director of **Link-Belt Co.'s** new physical testing and research laboratory at Indianapolis.

Robert B. Haarde was appointed northeastern New Jersey sales representative for residential, commercial and industrial boilers, radiators and heating accessories of **National Radiator Co.**, Johnstown, Pa. He was a staff member of the New York branch sales office.

Malsbary Mfg. Co., Oakland, Calif., maker of steam cleaners, appointed four direct factory representatives as follows: **Charles W. Gilmore** will cover eastern Pennsylvania and southern New Jersey; **James M. Williams,** Tennessee, Mississippi, Kentucky and Alabama; **George Karikas,** Michigan, Ohio and western Pennsylvania; and **Robert L. Garrison,** Iowa, Illinois and Indiana.

Watson-Stillman Co., appointed **Jackson Kemper** as general manager of sales, distributor products division. He joined the company in April, 1951, as assistant to the late **A. G. York,** vice president.

J. W. Ross was appointed assistant to the vice president and general manager of **Douglas Aircraft Co.,** El Segundo, Calif., division. **R. A. Myers** was appointed works manager.

Carl J. Tsaloff was named production manager, aeronautical division, **B. F. Goodrich Co.,** Akron. He has been manager of the company's Cadillac, Mich., plant since last January.

R. H. Frank, chief metallurgist, Bonney-Floyd Co., Columbus, O., was elected chairman, **Electric Furnace Steel Committee of AIME. W. M. Farnsworth,** assistant district manager, Central Alloy & Chicago district, Republic Steel Corp., Massillon, O., was elected chairman of the committee for the 1952 conference, and **F. O. Lemmon,** melting superintendent, Ohio Steel Foundry Co., Springfield, O., as vice chairman. New members of the executive committee include: **M. J. Meinen,** steel works superintendent, Crucible Steel Co. of America, Midland, Pa.; **Clyde Wymna,** metallurgist, Burnside Steel Foundry Co., Chicago; and **G. Derge,** Jones & Laughlin professor of metallurgy, Carnegie Institute of Technology, Pittsburgh.

OBITUARIES...

Alfred P. Brill, 71, retired president and chairman of the board of **Rund Mfg. Co.,** Pittsburgh, died Dec. 11. Before retirement in 1945, he was associated with the Rund company for 45 years.

James S. Beckwith, 72, founder and board chairman, **Beckwith Machinery Co.,** Pittsburgh, died Dec. 16. He was a pioneer in the use of heavy machinery in construction and road building.

James F. Fenning, 47, manager, Raybestos division plant, **Raybestos-Manhattan Inc.,** at Stratford, Conn., Died Dec. 16.

Frank Adams, 68, president, **Frank Adams & Co.,** Norwood, O., structural steel and scrap metals concern, died recently of a heart attack.

John E. Gill, superintendent, **Lake Shore Pattern Works,** Erie, Pa., died Dec. 13.

S. Walter Platt, 65, president of **Platt Steel & Supply Co.,** Pittsburgh, died Dec. 16.

Rolling Steel Rods — *From a scratchboard drawing for Pittsburgh Steel Company by William Pendred*

Progress in Steel

The red-hot steel rods you see above, racing through the continuous rod mill in the Pittsburgh Steel Company Works at Monessen, Pennsylvania, soon will be produced in even greater quantity as a result of the company's planned Program of Progress.

The entire program has as its ultimate goals: a fifty-percent increase in steel making capacity by July, 1952, and greater diversification of finished products by the addition of hot and cold sheet mills at the Allenport, Pennsylvania, Works.

For more than a year construction has been proceeding at an accelerated pace. Substantial improvements are being made in the blast furnaces and open-hearth furnaces to provide the additional steel making capacity. The installation of the new high-lift blooming-slabbing mill is nearing completion. It will supply semi-finished steel in greater quantity to the wire and tubular departments. Next year it will also furnish slabs to the new 66-inch sheet mills now under construction. These facilities have been further augmented for the production of flat rolled products by the recent acquisition of the Thomas Strip mills at Warren, Ohio.

The Program of Progress at Pittsburgh Steel is an important part of a vast movement in the steel industry which will be marked as the greatest period of steel expansion in history. The results will be reflected throughout the world for years to come, as only through the production of more and better steel can vital military needs be met and civilian requirements supplied to help keep the world free.

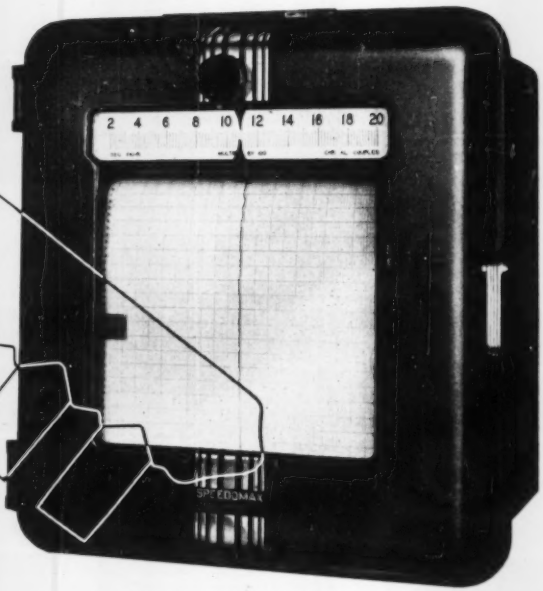
Pittsburgh Steel Company

Pittsburgh, Pennsylvania

TEMPERATURE CONTROL

Matched to your plant's

FURNACE PRODUCT PRODUCTION



Need to get more work out of your furnaces and ovens? The pyrometer that fits the heating equipment, the product and the production need can do a great deal to turn out more tonnage, and also more that meets specifications.

Two Types of Control

The secret of successful automatic control is very simple; just turn the heat up and down in the particular way the furnace and product prefer. And there are only two general ways: On-Off Control, and Three-Function Control.

On-Off Control Can't "Think"

On-Off Control turns the fuel all the way up when temperature drops to a predetermined low point; turns it all the way down again at the specified high point. Temperature will of course undershoot and overshoot; when cycling is inside bounds, this simple control is very popular.

Three-Function Control Can "Think"

Instead of turning fuel up and down at preset limits, three-function control in effect, keeps looking at temperature trends. If they are trying to get out of hand, the Controller heads them off. This "thinking" is done in three ways:

1. Fuel is turned up and down in proportion to the furnace's heat change. (Function one)

2. If the furnace doesn't respond when the fuel is changed, the instrument waits a little—moves the valve again—keeps this up until the furnace does respond. (Function two)

3. If the temperature jumps, as when a heated charge is removed or a fresh charge put into a furnace, the speed of the resulting change can be considered by the Controller. (Function three)

User Tunes the Control

By turning dials on the control pyrometer, the user tunes the three functions to the process: he simply uses his common sense and experience. A big benefit is thus: that every furnace control can be tuned by the best-qualified man in the plant.

Further information on request; contact nearest L&N office or 4957 Stenton Ave., Phila. 44, Pa.

LEEDS LN NORTHRUP

Jrl. Ad. N 33(52a)

Production and Engineering
NEWS AT A GLANCE

WRAP-AROUND STAINLESS — Stainless steel "wraps" will make Heppenstall Co.'s old Pittsburgh office building a strikingly modern streamlined windowless structure. The roof and all four sides of the multiwindowed, four-story building, will be sheathed in stainless steel (the 17 per cent straight chrome type), except for door openings and a contrasting trim of colored tile at the base. Limestone coping above the first and third floors has been chipped away to provide a flat exterior wall surface. Hooks in the wall will support a light steel framework from which the tile and vertical stainless panels will be suspended. The building will be air-conditioned; and special painting and lighting used on interior walls.

MORE TROUNCE TO THE BOUNCE—Aircraft landings at 240 mph are simulated on a new high-speed, inertia-type tire and brake dynamometer used in developing high speed tires for supersonic aircraft. Actual landing conditions can be duplicated through varying speed and load on the tires. A tire casing now being tested is not much larger than a standard automobile tire, yet carries ten times as much load at high speeds. Another change in tire design brought on by high speed landings is change-over from drop-center wheel rim to a flat-based type, which decreases tire-flapping and swerving after a blowout.

MORE SULPHUR BY '53—A newly-discovered sulphur deposit in Louisiana will increase domestic production by 1953. The U.S. produces more than 10 times as much native sulphur as the rest of the world combined. Practically all the domestic sources are in Texas and Louisiana, whose mines ship nearly 5 million tons annually. Major use of sulphur in the steel industry is in the form of about 500,000 tons of sulphuric acid annually for cleaning or pickling various steel products such as sheet, strip, wire rods.

BEARING METAL FABRIC—Filling the gap in hardness range of ordinary bearing metals between hardest types of soft antifriction metals and softest copper-lead compositions is the aim of a recent invention. The development envisages the use of a fabric of relatively hard metal wire embedded in a matrix of soft antifriction metal. During experiments four layers of fabric made of soft copper thread were compressed under 1200 psi in a tubular shell by an expanding mandrel. The resulting compact, which contained 30 per cent copper by volume, was then tinned by dipping. The hot tinned compact, was placed in a suitable mold and a lead-base antifriction alloy containing 5 per cent antimony, 8.5 per cent tin and the remainder lead was cast into the mold to fill the interstices in the copper thread compact. The resulting bearing contained the harder copper thread embedded in the softer antifriction matrix.

CORN ON THE CARBON—Introduction of corn cob grits as an abrasive material for cleaning electrical equipment is the outcome of a search for a cleaning process that would eliminate fire hazards and toxic effects inherent in use of liquid solvents. Corn cob grits yield a soft pellet which has remarkable cleaning properties and is noncorrosive. Typical applications are on motors, motor controllers and other electrical equipment which have become covered with dust and grime. A corn cob machine works on the same principles as a sand-blast plant.

OVERLOOKING VANADIUM?—Designers looking for a lighter-than-iron structural material with good flexural rigidity and corrosion resistance may well cast their eyes at pure vanadium. This once rare metal is now available in massive form for remelting as in ingots, bars, sheet and foil. Pure vanadium machines easily; it can be readily welded with regular shielded arc methods. p. 52

SALT SANS RUST—Rust-inhibiting phosphate mixed with rock salt may be the answer to winter's toll of car bodies and bridges corroded by snow-melting salt spread of streets and highways. As little as one pound of the chemical mixed with 100 pounds of salt will protect metal from salt brine rusting, the producer says.

GALVANIZER SAVES FUEL—During weekends, holidays and other periods of nonproduction, one galvanizer applies a 4-inch layer of vermiculite on top of molten zinc in 60-ton galvanizing pots, turns off 20 of his 32 gas burners, and goes home. A lot of fuel is saved and the metal kept at the desired temperature. The blanket of light-weight mineral costs little because it can be scraped off and reused.

ELECTRICITY AT 942 MPH—Supersonic speeds up to 942 miles per hour will be reached by the whirling blades of a giant turbine-generator being built by Westinghouse. It will take an hour and a half to bring the machine to top speed; half an hour to stop it. The generator will furnish enough electric power to meet the needs of a city of 200,000 people.

Metalworking Outlook—p. 15 *Market Outlook—p. 81*

PURE VANADIUM... A promising

For structural parts in which flexural rigidity is the determining factor, high purity vanadium could be a first-choice material. The metal also has high salt water corrosion resistance and negligible magnetic susceptibility

VANADIUM is one of the most recent of the rare metals to become industrially available. Pure vanadium metal has been rare, even though alloys of vanadium have been produced in quantity for many years. It has been considered a rare metal primarily because it is difficult to produce in the metallic state without the addition of alloying elements.

Vanadium is eighth in order of natural abundance of those metals useful for structural purposes. In this respect it ranks ahead of nickel and copper.

Good Structural Properties—Pure, ductile vanadium metal can now be obtained in massive form for remelting, as well as in ingots, bars, sheet and foil. The metal is lighter than iron, has good structural properties, and resists pitting and corrosion by salt spray and sea water. It can be rolled at ordinary temperatures; cold reductions up to 85 per cent have been made without annealing. Pure vanadium machines well and is easily welded with regular shielded arc methods.

As a part of a symposium on rare metals at the 97th meeting of the Electrochemical Society, E. D. Gregory, Westinghouse Electric Corp., described work conducted with co-workers, W. C. Lilliendahl and D. M. Wroughton on the production of ductile vanadium by calcium reduction of vanadium trioxide. The starting materials used in this vanadium preparation were the oxide, V_2O_5, distilled calcium metal, which should not contain over 100 ppm of nitrogen, and 99.5+ per cent assay calcium chloride.

First step is reduction of V_2O_5 to V_2O_3 at 600° C, in hydrogen. The reaction is relatively fast and is conveniently carried out in a tube furnace using nickel or stainless steel boats. A brownish black product is obtained according to the following reaction:

$$V_2O_5 + 2H_2 \rightarrow V_2O_3 + 2HO_2O$$

Mixed with Calcium—This product is ground to pass a 100-mesh Tyler screen and mixed with cut calcium, approximately ⅛-inch mesh, and powdered calcium chloride in the proportion V_2O_3, 1 mole; calcium 6 moles; and calcium chloride, 1 mole. The charge is then placed in an iron container. This container was previously lined with calcium or magnesium oxides to prevent iron contamination during the reduction cycle.

Charged container is supported inside the Vycor bottle. The latter rests on the brass tubulated plate to which it is sealed with vacuum wax. The Vycor bulb is evacuated and 99.7 per cent argon gas admitted to a pressure of about 0.8 atmospheres, and the stopcock closed. The charge container is heated by high-frequency coils surrounding the Vycor cylinder. After the reaction mass fires the container is maintained at approximately 1000° C for 1 hour, which is sufficient to complete the reduction.

When cold, the charged container is removed and leached with 40-50 per cent acetic acid. After this reaction is complete the vanadium powder is washed and recovered by filtration. The over-all yield in these Westinghouse experiments was 80-85 per cent. Ingots of vanadium may be formed by pressing the powder in steel dies at 15-20 tons per sq in., and then sintering in vacuo. It is desirable to sinter the powder directly to maximum density by heating up to 1400-1500° C for 1-2 hours.

Vacuum Furnace Used—A vacuum sintering furnace for this operation is illustrated. This comprises a Vycor cylinder (A) which rests on a water-cooled, tubulated brass plate (B), hermetically sealed with vacuum wax (C). The tubulation (D) serves for evacuation of the furnace through a conventional high vacuum exhaust unit.

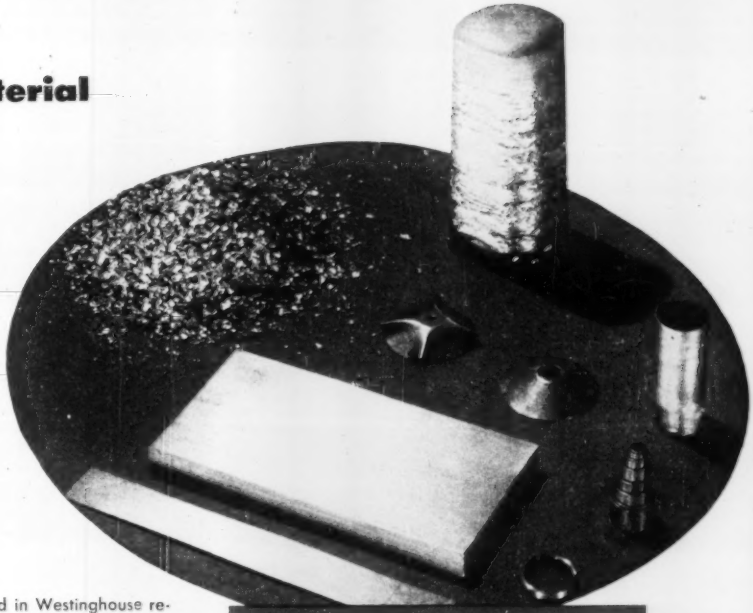
Pressed bar (E) is suspended centrally in the molybdenum tube (F) which rests on the molybdenum block (G) set on insulators (H). The bar is suspended by tantalum wire (I) and held in position by the molybdenum cover (J). The molybdenum tube (F) is surrounded by two split molybdenum shields which reduce radiation to the Vycor bottle during operation. The source of power is a 50 kva, 10,000 cycle motor-generator. Inner cylinder of molybdenum is heated by activating the coils (K). The furnace has been used for sintering at temperatures up to the point at which the vapor pressure of molybdenum becomes a limiting factor. Vanadium produced by this method may be fabricated into ductile wire or sheet.

Ductile Metal Produced—According to A. B. Kinzel, division vice president, Electro Metallurgical Division, Union Carbide & Carbon Corp., major effort has been expended at the company's research laboratories to develop a process for producing ductile vanadium that

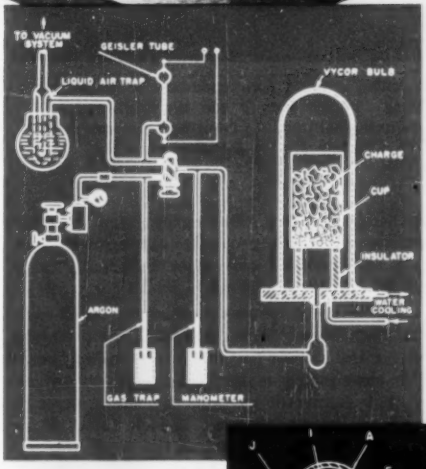
TENSILE PROPERTIES AND HARDNESS OF PURE VANADIUM

Condition	Prop. Limit, Psi.	Yield Strength, Psi.	Tensile Strength, Psi.	Elongation in 2 In.	Rockwell Hardness
Annealed 1 hr., 1500° F.	61,000	76,000	81,000	7%	B-76
Cold rolled 60%.....	63,000	101,000	107,000	1 to 2.5	B-92
Cold rolled 75%.....	68,000	110,000	117,000	1 to 2.5	B-95
Cold rolled 80%.....	69,000	142,000	155,000	1 to 2.5	C-28

Based on Electro Metallurgical Co. tests.



Available forms of pure vanadium include ingots, plates, bars, sheet and strip, and chips for remelting. Fabricated shapes shown are a Belleville-type spring, a conical-helical spring, ring and tube. Photo courtesy of Electro Metallurgical Co.



Right—Reduction apparatus used in Westinghouse research on production of ductile vanadium. Courtesy the Electrochemical Society

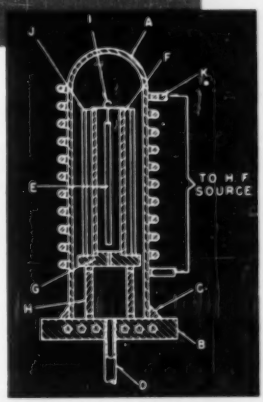
could be adapted to operation on a reasonably large scale which would give a product of quality sufficient for ready fabrication. The research started with basic information on the reduction of vanadium oxides. Techniques that had been developed through the years in the laboratories as well as the plants of the Electro Metallurgical Division and U. S. Vanadium Corp. were applied. Ductile vanadium metal has been consistently produced within the following chemical limits:

Oxygen	0.05	to	0.12	%
Hydrogen	0.001	to	0.004	%
Nitrogen	0.02	to	0.04	%
Carbon	0.03	to	0.07	%
Vanadium	99.9	to	99.8	%

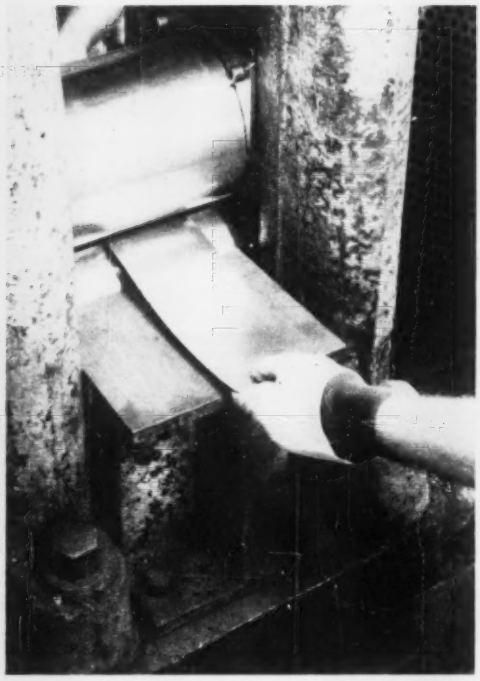
Within these limits, yields have been consistently greater than 90 per cent and the metal produced is suitable for either working or remelting as required. The product is described by Kinzel as essentially a solid mass of crystalline vanadium; it is termed "massive vanadium" to differentiate it from ingot metal.

Massive vanadium may be remelted by using a tungsten arc in an argon cooled atmosphere and a water cooled copper mold. This method does not differ much from that now used industrially for molybdenum and certain other metals with which the process has proved commercially practicable.

Fabricating Techniques—The massive vanadium or the argon-arc-melted ingot may be hot worked with or without protective sheaths. Surfaces of unsheated masses or ingots are conditioned by machining or



Right—Vacuum sintering furnace for pure vanadium powder. (A) Vycor cylinder, (B) tubulated brass plate, (C) vacuum wax, (D) tubulation for evacuating furnace, (E) pressed bar, (F) molybdenum tube, (G) molybdenum block, (H) insulators, (I) tantalum wire, (J) molybdenum cover, (K) coils



Cold rolling strip of pure vanadium to 0.020-inch thickness. In this form it can be fabricated into springs and other parts requiring high dynamic stress. Courtesy Electro Metallurgical Co.

grinding before working. Rolling or extrusion without sheathing requires a protective atmosphere. This method is recommended only when sufficiently large quantities of metal are involved.

Sheathing is the preferred method for small-scale industrial operations. Stainless steel is the preferred material for the sheath because its hot rolling characteristics more nearly match those of the vanadium. The sheath is fabricated by Heliarc welding pieces of stainless steel, generally about ¼-inch thick, so as to make a tight-fitting box around the ingot.

Optimum initial breakdown temperature is 2000 to 2100°F. Once the ingot is broken down, the hot working temperature may vary from 1475 to 2100°F. In general, rolling practice with respect to passes and reduction follows that established for austenitic stainless steels. Since in the case of vanadium there is no discontinuity in effect between hot and cold rolling, the rolling operation may be continued right down to room temperature. For various practical reasons, 1100 to 1300°F is recommended as a good finishing range. After rolling, the sheath is removed by slitting and peeling. Depending on rolling conditions used, it may be desirable to remove about 1/16-inch from the surface of the rolled vanadium to make sure no iron or other elements from the sheath are present on the surface.

Cold Rolling—In making sheet or foil, most common practice is to hot work down to about ¼-inch thickness. This is followed by cold working to produce the final article. Strips of vanadium cold rolled to 0.020-inch thickness are ready for fabrication into springs and other parts requiring high dynamic stress. Vacuum or inert gas annealing at 1650°F, for 1 hour, puts the hot-worked material into condition for subsequent cold rolling. Electro Metallurgical recommends that the hardness of the surface to be cold worked should be to a hardness less than Rockwell B-85.

Vanadium does not work harden appreciably even during cold working so that cold working techniques are not critical. A total reduction of 85 per cent can be made without intermediate annealing, but in so doing the hardness may reach Rockwell B-90 to 100. An increase in malleability of vanadium has been noted on heating from room temperature to about 575°F. Since the oxidation of vanadium does not take place below 575°F, there may be advantages in cold rolling the metal between 400 and 600°F.

Heavy Initial Passes—In fabricating the metal produced in the Westinghouse studies, previously referred to, initial breakground was accomplished by heavy passes to give about 25 per cent reduction in area, the metal being heated in argon to 600°C between passes. However, use of argon may not be necessary up to this temperature because only mild surface oxidation appears to occur. Rolling is continued with gradual reduction in drafts to a minimum of 10-15 per cent per pass until annealing becomes necessary, usually at about 50 per cent total reduction in cross-sectional area. The metal may be completely annealed in vacuo at 850°C for 1 hour.

Most satisfactory results in etching vanadium metal for metallographic purposes are obtained with either concentrated ammonium hydroxide containing 5 to 10 per cent hydrogen peroxide or 10 per cent sodium carbonate used electrolytically. Both of these etchants delineate the structure of vanadium and bring out any precipitated carbide or nitride phase. Electropolishing is also useful in preparing samples for metallographic examination.

Machine Like Steel—Machinability of pure vanadium appears to be about the equivalent of cold rolled steel. The metal is free-cutting. Tools such as those used for copper with a high rake angle of about 15 degrees and a sufficient clearance angle of 7 to 15 degrees have been used successfully. To produce a good surface finish, high cutting speeds and light cuts can be employed. A light lubricant improves the quality of the machined surface. Vanadium is easier to machine than Monel, nickel, stainless steel and titanium; however, it is not quite so easy as copper, yellow brass, or aluminum.

Vanadium may be bent, stamped and pressed using conventional methods. The Belleville spring shown as a component in one of the photographs was made in a simple lead-lined die. Rubber plungers may also be used.

Vanadium may also be welded using argon shielding and a Heliarc torch. Annealing after welding is not necessary; however, stress relieving around 1100°

F in an inert atmosphere may be used to insure dimensional stability.

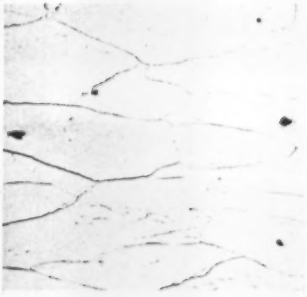
Properties Vary—Physical properties of vanadium metal, as is the case with some of the other rare metals, vary with the oxygen, nitrogen, and carbon contents. Amount of cold working also affects the properties of the metal as shown by the Electro Metallurgical data given in the accompanying table. Hardness varies from Rockwell B-75 to C-29 and can be fairly well controlled within these limits. The amount of gases, such as oxygen and nitrogen, in solid solution has a pronounced effect on hardness, ductility and tensile strength. In general, these gases result in increased hardness and tensile strength, and decreased ductility. The only satisfactory method for determining oxygen in vanadium appears to be the vacuum fusion technique.

Density of vanadium is appreciably lower than that of steel and the elastic modulus is relatively high for that density. The modulus-density ratios for steel and vanadium are practically equivalent (3.7 million) and higher than that for titanium, which is variously given as 3.1 to 3.6 million. From this comparison, indications are that, other things being equal, vanadium would be the first choice for a structural part in which flexural rigidity was the determining factor. This and data on static tensile properties indicate that vanadium should make a good spring material.

Data on vanadium produced in the Westinghouse studies show an ultimate tensile strength of 100,000 psi for annealed vanadium and 140,000 for work-hardened metal. The corresponding hardness values were reported to be 230 VPN for the annealed and 330 VPN for the work hardened. The corresponding elongation for fully annealed samples of 0.10 inch diameter and 0.5-inch gage length was 23 per cent; for the work-hardened material, 0.05-inch diameter and 0.5-gage length, 3 per cent.

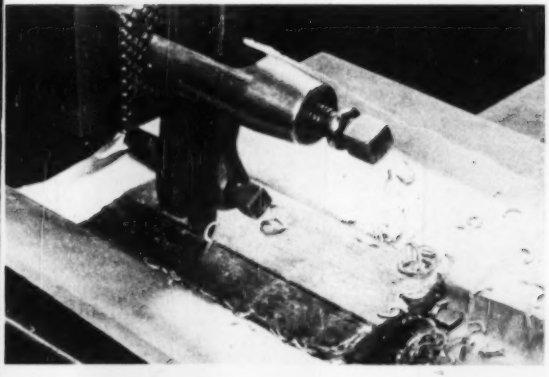
Such figures for tensile strength and elongation are for metal containing appreciable oxygen and nitrogen. As purity of the metal improves, a considerable drop in tensile strength and increase in elongation may be expected. Vanadium is very susceptible to hydrogen embrittlement which can be removed by heating in vacuum to 400°C.

Corrosion tests have shown that vanadium is resistant to pitting and corrosion by sea water and salt spray. This resistance, in view of the metal's high elastic modulus and negligible magnetic susceptibility, might well lead to interesting applications in instruments and parts for dynamic stress on board ship or in salt water atmospheres.

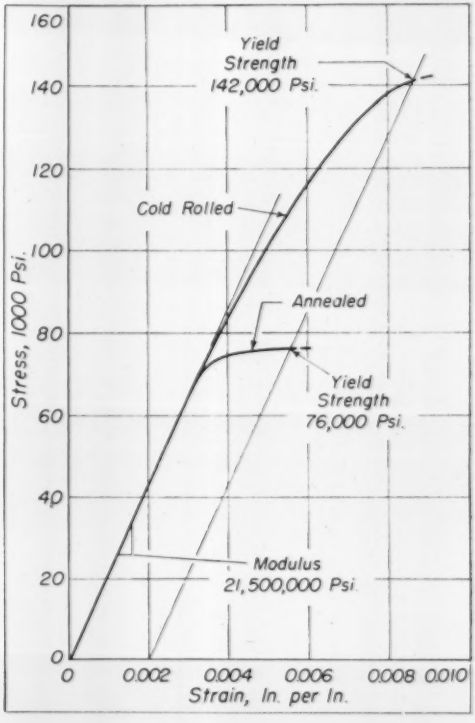


Left — Microstructure of hot rolled pure vanadium. Electropolished; etched in ammonium hydroxide plus hydrogen peroxide. X250

Below—Machining slab of pure vanadium. Parts of standard dimensions can be produced with good surface finish



Below—Stress-strain diagrams for pure vanadium.



Eliminate Grinding Damage • • • Reduce

Too much heat between grinding wheel and work can cause cracking and skin softening, two principal reasons for tool failure due to improper grinding. By feeding coolant directly through the grinding wheel actual cutting temperature can be lowered by as much as 600 degrees

PHYSICAL damage which occurs when tools are improperly ground consists of either or both cracking and skin softening. Almost always, this damage cannot be seen with the naked eye; it requires laboratory inspection such as Rockwell, Magnaflux and acid-etch tests to determine the extent of harm done. Many tools may have near-perfect finish, dimension and flatness, when given a visual inspection, but may actually be so abused in the grinding process as to be of little or no value in actual operation.

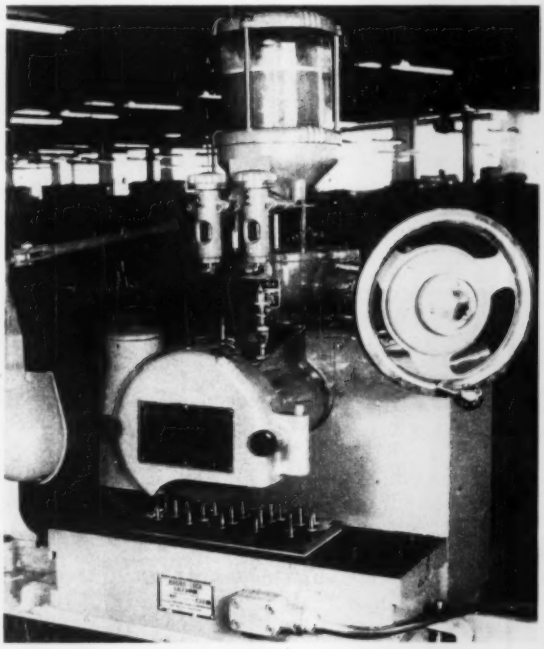
Too Much Heat—In every case, all the damage is caused by one factor—too much heat generated between grinding wheel and workpiece.

Minute surface cracks, so tiny they cannot be seen, provide a good starting point which may eventually grow until a die or other tool actually breaks into two or more parts while in use. Sometimes the breakage might even occur when the die is at rest on a shelf. In some cases the breakage happens immediately.

"Skin softness," the other type of damage, is not so easily noticed, but can be just as costly. In every case, steel selected for any tool is chosen according to its various properties for any particular job. The metallurgist has provided a suitable alloy, and the heat-treater has carefully brought the alloy to exactly the proper hardness and toughness to withstand the shock, heat, strains and stresses to which it is to be subjected. However, all of this skill may be lost through improper grinding, for too much heat can and usually does soften the surface to a depth which can go as far into the material as 0.030-inch. Naturally, a soft cutting edge is a poor one, for it rapidly becomes dull and needs resharpening. Unless it is badly burned, you cannot "see" a soft surface, but the constant delays for resharpening can easily be seen in the profit-and-loss statement.

Cools Through Wheel—Grinding damage, since it is rarely seen or recognized, is an insidious factor which wastes many hundreds of thousands of dollars and man-hours. Occasionally it erupts into full view, as in photo that shows 6-inch piece of 52-100 steel, hardened to 65 Rockwell C. Front half of piece was ground using recommended speeds and feeds and using DoAll's "cool grinding" technique to keep the work cool. In this system the coolant is forced directly through the wheel, from inside out, making sure each cutting particle in the wheel is provided with coolant.

Back of this piece was ground dry, using a fast table speed and taking a very heavy cut. In doing so, a great amount of heat was generated, the result of which is easily apparent. However, there is no basic difference between this crack and the ordinary minute surface cracks ordinarily found wherever work is improperly ground. This example of grinding damage occurred in DoAll's experimental laboratory during comparative tests of various types of coolant systems, and also grinding without coolant. It provides a graphic example, in magnified form, of what happens



By cooling through the wheel, each cutting particle is thoroughly saturated. All vitrous-bonded wheels are sufficiently porous to permit flow of coolant

Tool Failure

By H. POTiLE
Grinder Division, DoAll Co.
Des Plaines, Ill.

Six-inch piece of 52-100 steel, hardened to 65 Rockwell C. Front half of this piece was ground by the DoAll system, back was ground dry, using a fast table speed and taking a very heavy cut

to a tool that is improperly ground.

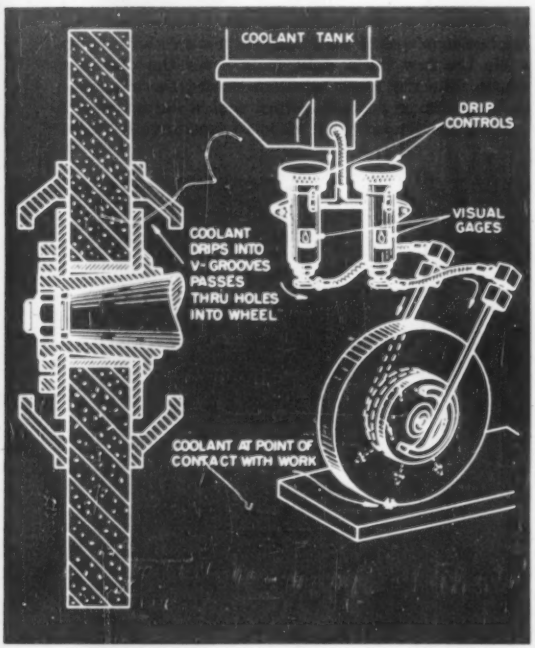
Lower Temperature, Better Grinding — Since heat causes practically all grinding difficulties, anything which will reduce grinding temperatures is certain to provide better results. The ordinary way to do this is to pump a coolant solution onto the workpiece while it is being ground. This carries away some of the heat, but in most cases there is no coolant at the point where it is needed—under the grinding wheel—for the air blast created by the wheel keeps the coolant away.

By cooling directly through the wheel, each cutting particle is thoroughly saturated. In grinding, just as in any machining operation, increased production and longer tool life are obtained if the cutting tools are cooled. Each abrasive grain is an individual tool such as the bit in a production lathe. If it receives a constant flow of coolant, it cuts faster, lasts longer, and produces a better surface.

In feeding the coolant through the wheel, centrifugal force provides the power, atomizing the solution and flushing the wheel to prevent loading and glazing. An optical pyrometer reveals that the actual cutting temperature may be as much as 600 degrees cooler than when ordinary coolant systems are used, and a further benefit is realized in that the work is 100 per cent visible—an important feature in form and shoulder grinding.

Cool grinding requires no special wheels, all of the ordinary vitreous-bonded wheels being sufficiently porous to permit the flow of coolant. This technique is especially advantageous in grinding the new hard and tough alloys. The improved alloys for tools are necessarily difficult to grind, for it is their ability to withstand abrasion which makes them good tools.

Schematic diagram showing how "cool grinding" works


COOLANT TANK
DRIP CONTROLS
VISUAL GAGES
COOLANT DRIPS INTO V-GROOVES PASSES THRU HOLES INTO WHEEL
COOLANT AT POINT OF CONTACT WITH WORK

Tough Alloys Readily Molded

Circular shields used in jet aircraft after-burner sections and combustion chambers can be molded on a machine devised and patented by Cyril J. Bath, president of Cyril Bath Machinery Co., Cleveland. Designated as a Rotary Draw Former, it is produced in sizes from 12.5 to 100 tons and has processed Inconel, Haynes Stellite, vanadium and titanium alloys.

Leading manufacturers including Pratt & Whitney, Wright Aeronautical, General Electric, General Motors, Briggs, Chrysler, Kaiser and Westinghouse have already placed orders, the company announces. The machine uses the Bath method of shaping metals in a stretched and unheated state. It looks like the turntable and arm of a huge record player that stretches metal with the arm and draws it around a centrally placed die as the table slowly turns. The device resembles the contour former but has supplementary equipment to insure exact contact with the die. Accuracy is proved to 0.0001-inch, the inventor says.

Test Equipment Redesign

Improved performance, faster deliveries and lower prices are among benefits resulting from re-engineering and standardization of the Magnaflux line

RE-ENGINEERING of magnetic particle inspection equipment was recently completed by Magnaflux Corp. Included are the most popular, general purpose wet horizontal line and the portable unit line. The new lines are created to offer shortened delivery schedules and incorporate functional and detail design improvements. Lower prices are also achieved in some cases.

Grew Like Topsy—Since the company is only 21 years old, many standard units were designed and built to fill a specific need, then hung on to become standard. A situation of this sort resulted in cumbersome lines, full of holes and not well scaled from the standpoint of price and utility. Mounting order volume made it apparent that delivery schedules would have to be lengthened. Magnaflux was building too many different models to handle this increased volume.

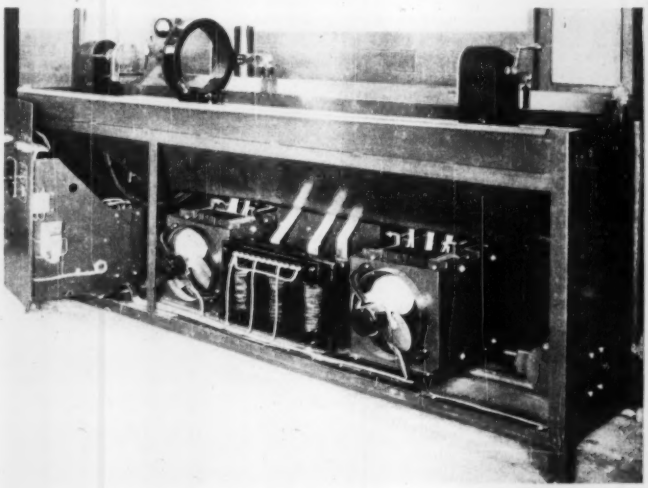
The old design had been practical and workable and, as such, remained frozen as far as major improvements were concerned. Since re-engineering already was indicated, improvements were another reason for going ahead. A last and important reason for our decision is the effect on company income. Building a better unit at a lower price and offering better delivery, should mean higher volume and consequently increased income.

Starting Point—In setting up the program certain fundamentals had to be accepted. Magnaflux process involves magnetizing a part circularly by passing current through it or longitudinally by placing the part in an energized coil. Horizontal wet units require an agitated tank to store ferrous particles suspended in a light oil for hose application to the part. These units also require heads to clamp the part for circular magnetization and a movable coil for longitudinal magnetization.

Power packs, to provide the safe, low voltage, high amperage used for magnetizing were established by past experience. From 1000 to 6000 amp are used for magnetizing most parts. The portable units presented the lesser problem since actual magnetizing is accomplished away from the unit using accessory cables or contacts, and dry powder particles or an expendable suspension.

Looking Over the Facts—Engineering the changeover from the old line of horizontal wet units to the new started by listing the old units and entering new units to provide a size and utility scaled line. The old line numbers 11 units and yet has two holes in it, while the new line's eight units cover the complete range. The new units equal or exceed the old units in magnetizing current output and working length.

Rough estimates were made to determine whether



Simplification effected through standardization is quickly evident in comparing a new 96-inch unit at left with an old 48-inch unit at the right. Improved wiring arrangement resulting from preassembly of power pack is evident in new unit. Coil is not included in photograph of old unit

Far right—Simplest of the ac units in the redesigned line. All electrical components fit on the electric shelf and are wired outside the unit. On larger units and direct current units, transformers and rectifiers are placed off the shelf beneath the tank

Pays Off

A. E. CHRISTENSEN
Chief Design Engineer
Magnaflux Corp., Chicago

or not selling prices would be approximately scaled. It appeared they would be if sufficient standardization could be accomplished.

Next came an analysis of what goes into a complete horizontal wet unit. Merely reducing the line to eight units would not achieve the desired end result. Many designs were considered and pilot models built to determine the best method of obtaining the degree of standardization necessary.

Overlapping Models—To effect this degree of standardization, we started with the frame assemblies and examined them. Why did we need three different 48-inch and 54-inch frame? The answer: They were designed around their respective power packs and varied esthetically. In order to achieve the standardization and economies desired, we decided some sacrifice in esthetics was necessary.

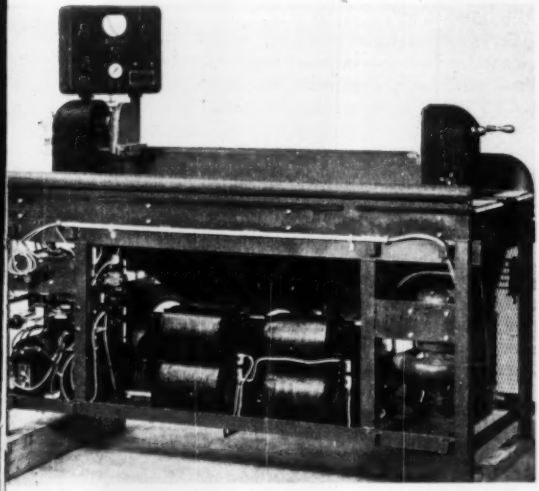
A more important decision was to divorce the power pack from the frame design except to allow sufficient room for it. Power pack is now built, then put in the frame. Not only does this method offer standardization economies but also cuts costs due to a simplified wiring operation and reduced floor area requirements in assembly.

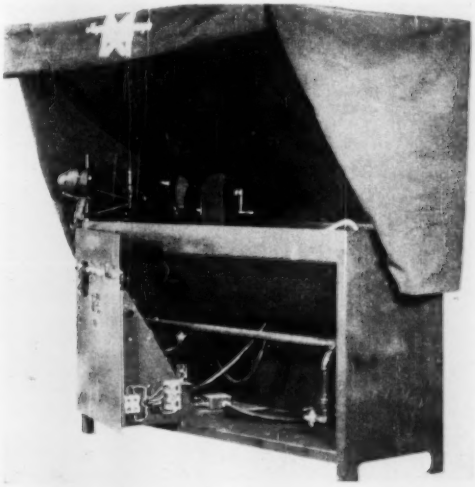
Frame Design Reviewed—Old type frames consisted of angle iron frames with light gage sheet metal tanks and panels screwed in place on all four sides. The new units weigh about the same but consist of a heavier gage sheet steel welded assembly. This change results in moderate labor savings during fabrication and additional savings in assembly.

Headstock redesign consists of replacing a cast base and cover with a somewhat more complex base casting and a flat sheet metal cover. A feature of the headstock is the built-in air cylinder. Cylinder front flange is machined directly into the casting and the barrel, rear flange, rod and piston are added. The barrel is a ball sized brass tube, extremely smooth and accurate.

Tailstock redesign follows the same pattern as the headstock. A cast base, cover and gear box are replaced with a more complex cast base and a sheet metal cover. Coil and rail redesign eliminated the fancy rear panel on the DTC units. A functional improvement on the coils is the use of flanged ball bearing wheels which, along with the elimination of brushes, makes them much easier rolling. Rail redesign, beyond elimination of bus bars, involves complete use of cold finished bar stock in lieu of bar stock and structural channels which required an expensive planing operation.

Careful Planning—The jump from 54 to 96-inch capacity was as carefully calculated as were the other phases of the program. Overall length of these





units is 18 to 24 inches over the working length. The 54-inch units are 72 inches overall and the 96-inch units are 120 inches. The old 72-inch units were about 96 inches.

Ten-foot lengths of steel, wood grille lumber, etc. are more economical to work with than are 8-foot lengths. Unit widths and heights are also calculated for economical use of raw material. Drop-offs and scrap are kept to a minimum.

Standardization and redesign were also carried to electrical components. Special three-phase dual voltage power transformers were designed to replace separate transformers connected for three-phase operations. Other improvements include a new agitation system for the suspension in the tank and a selector switch instead of a knife switch for head to coil change-over on the direct current units.

Easier Job—Portable unit redesign was considerably simpler. Basically it involves use of a single cabinet to accept four different power packs, replacing a previous and incomplete line of three power packs that required two cabinets. Assembly of various units is now the same where same components are involved and strategic use of nameplates and dial plates allows for varying the control panel arrangements. This equipment also is built for dual voltage operation.

Many advantages result from this redesign for both manufacturer and customer in addition to those already mentioned. Spare parts stocks can be reduced by customers operating several sizes or types of equipment, the working range of each piece of equipment is increased and maintenance is simplified. The manufacturer benefits because he need not rely so heavily on detailed sales forecasts and can set up stock orders that are in excess of short term requirements.

Average wet horizontal unit price is 25 per cent below that of the old unit average. Typical man-hour figures show reductions of 25 to 50 per cent for final assembly, 35 per cent for headstocks, 30 per cent for rails and 20 per cent for grilles. Standard unit deliveries average well under six months, a favorable contrast to published machine tool averages.

Pickling Baskets Made From Stainless Steel Scrap

BY fabricating pickling baskets from stainless steel scrap produced in the punch-pressing of aircraft exhaust system flanges, Ryan Aeronautical Co. has a long-life lower-cost basket. Carrying stainless steel jet engine parts and exhaust system components through some of the most corrosive solutions used in production processes, the pickling baskets were formerly made of wood.

Douglas fir 2 x 12-inch lumber, doweled together with wooden pegs, was used to fabricate the 22½ x 27 x 62-inch containers. They had to be weighted with lead to cause them to submerge in the baths. Because the lead was readily attacked by the acids, it was necessary to enclose it in protective coverings.

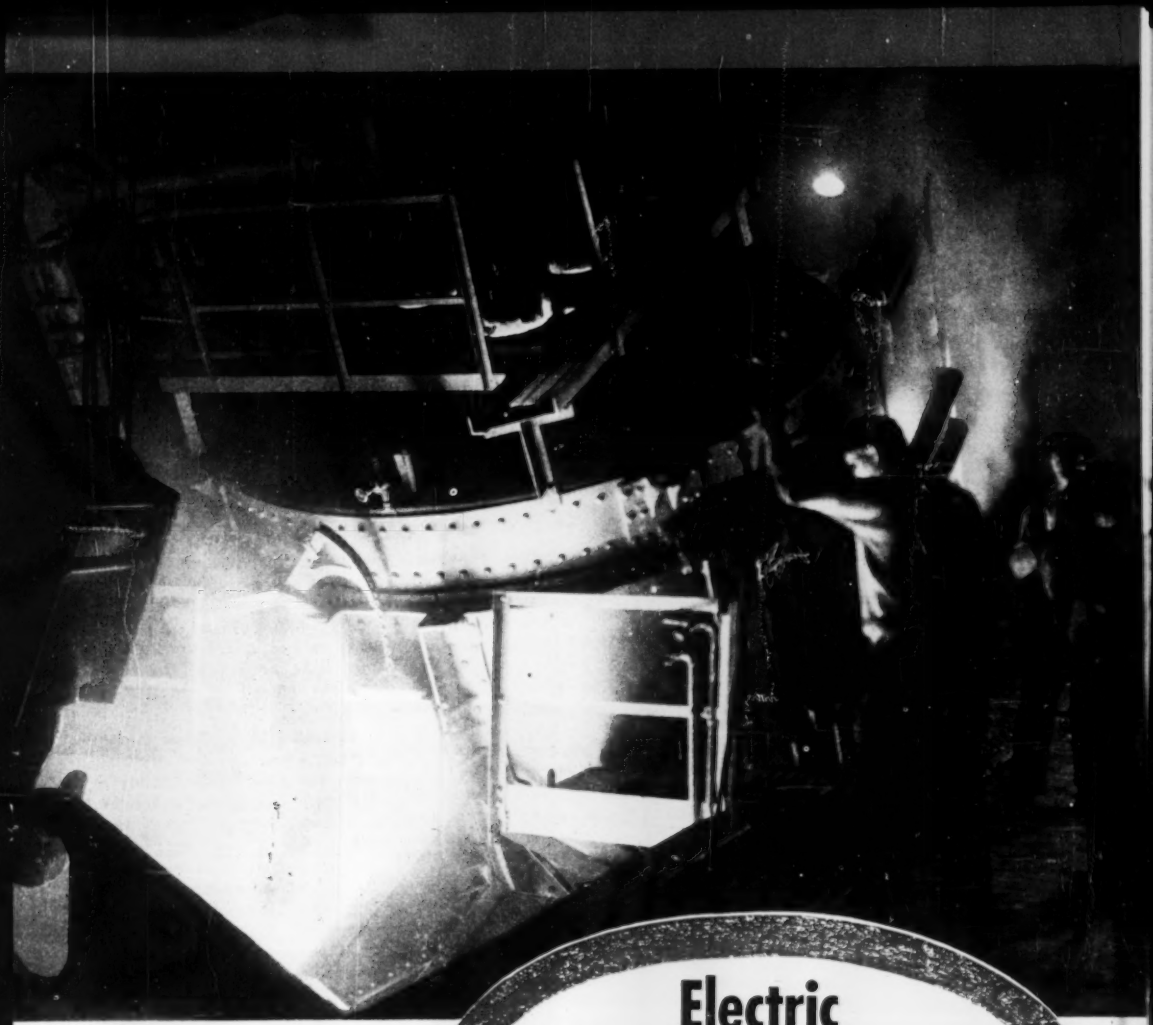
Wood was not satisfactory for these applications because it soon rotted away, leaving contamination in the tanks. When the pickling process was changed to include a high-temperature molten salt bath, wood was immediately ruled out because the heat of the bath would ignite the wooden baskets.

Service Life Three Months—Looking for a suitable material which would stand up under the attack from molten salt and the hot and cold combinations of nitric, sulphuric and hydrofluoric acids, Ryan plant engineers eyed the scrap being produced at the punch presses. Here, exhaust port flanges are neatly punched out of strips of stainless steel that are 5/16-inch thick—a 65-ton punch job.

Scrap was straightened, cut to length and arc-welded together for experimental baskets. From the first, these containers were eminently successful. With a service life of three months, compared to the ten-day existence of the old wooden baskets, they have saved substantial amounts of money. Because scrap stainless is used, a worthwhile conservation of the supplies of this metal is also effected.

Good Drainage—Capable of carrying up to 1000 pounds of parts, the baskets are designed with removable bottoms which can be released by simply turning dowels. Maximum drainage is obtained in their construction so that no salts or acids will be dragged out of the baths. The open construction also prevents explosive splashes when water accumulations are immersed in molten salts.

Stainless steel basket full of exhaust system parts start through a series of corrosive pickling bath tanks. Fabricated from punch press scrap material, these baskets are long-lived and efficient



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Blast Furnace Practice... III—Hearth and Bosh Reactions

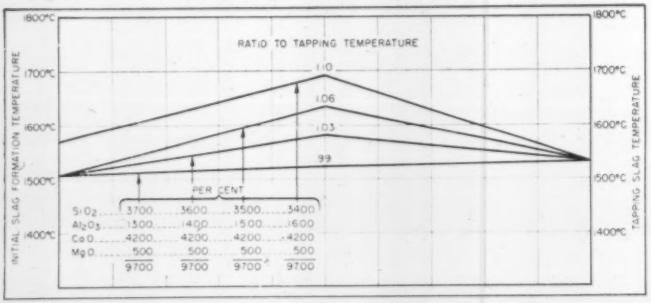
By CHARLES S. AGNEW
Consultant
Blast Furnace and Sintering Plant Operation
Cleveland

This is the third in a series on blast furnace operations in which the author explains why thermal conditions in the bosh exert a major influence on the fuel consumption and the productivity of the stack

ELIMINATION of volatile matter from raw materials is effected at the top of the furnace through consumption of volume of heat but at relatively low temperatures. After elimination of volatile matter there is a progressive increase in temperature for the nonvolatile solid matter as it absorbs heat during descent to the bottom of the furnace, culminating in consumption of the required volume of heat plus concentration of it to the temperature required to form slag and maintain it in a fluid condition. Emphasis is placed on the statement "to form slag" because slag formation requires greater degree of heat concentration than any other blast furnace thermochemical reaction. Thermal conditions created in the furnace bosh due to slag formation are of major influence in determining fuel economy and productive capacity of any blast furnace operation. This is a broad statement but it is believed to be amply supported by Bureau of Mines and McCaffery research, supplemented by data of actual furnace practice. Data, pertinent to the subject, is herewith quoted from Bureau of Mines technical papers.

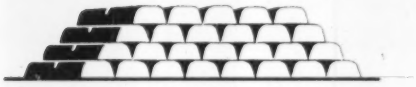
At plane No. 4 (Southern furnace operation) samples of solid material and gas analyses indicated that 80.5 per cent of the iron had been reduced to the metallic state, leaving 19.5 per cent to be reduced in the bosh and hearth; the metallic iron was in the sponge state and virtually free from silicon but had acquired 87.4 per cent of its casting silicon content while descending from plane No. 4 to 5. Phosphorous enters the iron in all three zones of the furnace, shaft, bosh, and hearth; some manganese enters the iron in the shaft but the larger percentage is reduced in the bosh. The bosh iron contained more manganese than the iron cast from the furnace, indicating some reoxidation of manganese as the iron is partially desulphurized while passing through the hearth. Coke is not consumed by combustion until it reaches a zone immediately adjacent to the tuyeres; some carbon is lost to solution before coke arrives at the tuyeres but the amount so lost is a variable.

Fig. 4—Minimum basicity temperature for 3 per cent acid tapping slag



Reactions Vary—These measurements of bosh and hearth chemical reactions must be reasonably representative of similar reactions in any blast furnace operation but the certainty that there is some variation in them is indicated by Bureau of Mines findings at the Northern furnace investigation where gas analyses indicated only 24.40 per cent of the iron had been reduced to the metallic state in the shaft, leaving 75.40 per cent to be reduced in the bosh and hearth. This complete reversal of the findings at the Southern furnace for the same reaction appears to establish the principle that the zone within the furnace where iron reduction occurs is not of major importance to operating practice or economy.

It also appears unlikely that there is as great variation in any of the other bosh and hearth reactions, because, while iron can be reduced from the oxide with either hydrogen (H_2) or carbon monoxide (CO) at temperature as low as 190°C, a temperature which is available continuously throughout the furnace from a few feet below the stockline at the top of the shaft, other reactions require temperatures which are not available



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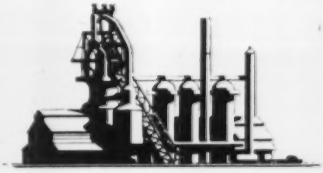

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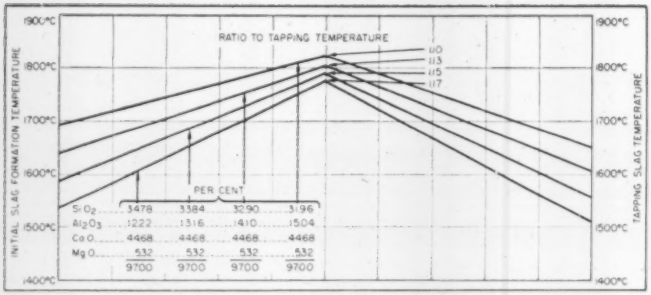


Fig. 5—Minimum basicity temperature for 3 per cent basic tapping slag

until stock enters the bosh, specifically (technical paper No. 397). Silicon is reduced in the electric furnace at 1460° C in the presence of iron, ferrosilicon is formed about 1200° C, manganese oxide is reduced in the presence of carbon at 1105° C, ferromanganese forms at 1030° C, and phosphorous is not completely reduced until a temperature of 1150° C is attained.

Casting Temperature of Iron — Iron cast from a representative normal furnace operation will be within a range of 1400 to 1550° C, with temperatures of slag, as cast from the furnace, being slightly higher. Since all temperatures required for reactions cited in the previous paragraph are below this "free running" temperature of slag, chemical reactions completed at those temperatures are all incidental to reactions of slag formation and the temperature required to maintain it in the free running condition. Temperature required for silicon reduction is the closest to the iron temperature, and this relationship is clearly depicted by the sharp decrease in the silicon content of iron when cold slag is flushed from the furnace. For incidental reactions it is then a problem of supplying the required volume of heat at the respective required temperatures, and for slag, a problem of further concentration of heat to attain higher temperature, as well as supplying volume of heat required for slag reactions.

Therefore, the greatest value to be attached to the knowledge of thermal requirements for incidental reactions appears to be that it emphasizes control of bosh and hearth operation and lies in formation of slag and maintaining it at a free running temperature. The reasoning is sustained by a condition which actual furnace operation demonstrates, namely, that iron having wide ranges in silicon content can be produced with tapping slags of identical chemical compositions. This fact emphasizes importance of considering slag chemical and mineral composition on its own merits with regard to effects of composition on thermal conditions in bosh and hearth operation.

A few years ago a series of articles was presented in the technical press* in which teachings of Bureau of Mines and McCaffery research were combined in a study of thermal effects in bosh and hearth operation caused by mineral composition of slag. A series of graphs illustrated how the changes in ratio between the four principal slag constituents (SiO_2-Al_2O_3-CaO-MgO) influence mineral composition of slag at different stages of its formation, and how they afforded opportunity for maximum concentration of heat in the lower bosh consistent with relatively low concentration in the upper bosh, and at the tapping stage below the hearth. The graphs also indicated the all-important influence which predominence of minerals having magnesia content has on slag.

Two of these graphs are reproduced in this article (Figs. 4 and 5), both in the plane of 5.00 per cent magnesia (MgO). Slags in Fig. 4 have 3.00 per cent *acid/base* ratios, and in Fig. 5 they have 3.00 per cent *base/acid* ratios; acid/acid and base/base ratios are held constant in both graphs. The 1945 study indicated slag having chemical composition shown for slag No. 3, Fig. 4, to be ideal for tapping slag chemical composition because mineral composition with it, in formation stages preceding the tapping stage, causes maximum concentration of heat in the lower bosh consistent with minimum loss from the upper bosh with gas entering the shaft and with slag tapped from the furnace below the hearth.

Affects Shaft Operation—Based upon calculated temperatures thermal requirements for slags Nos. 1, 2, 3 and 4, Fig. 4 would be the same as far as consumption and loss of heat to bosh operation with tapping slag is concerned. However, any increase in the formation temperature for slag No. 4 compared to slags No. 1, 2 and 3, would not only directly increase the loss of heat from the upper bosh but indirectly have a detrimental effect on the shaft operation by increasing the volume and velocity of gas passing through the shaft. Thus there would be a consequent lessened opportunity for heat transmission from gas to stock and a certainty of increased flue dust production.

Comparison of calculated temperatures in Figs. 4 and 5 indicates how thermal conditions in bosh and hearth operation change with change in chemical and mineral composition of slag, and clearly illustrates importance of that composition to thermal economy.

In actual furnace operation it is common practice to classify slag as either acid or basic as according to whether the total acid (silica and alumina) or base (lime and magnesia) constituents predominate. The practice is satisfactory for control of daily fluctuations in slag composition but in research for refinements in furnace practice, or to determine policy of raw material supply and control of thermal economy, it is not accurate or sufficiently indicative of thermal effects of various slag compositions because it does not indicate the degree of effect of the respective constituents as they vary in relation to each other.

McCaffery's diagrams offer a

*"Principles of Iron Ore Beneficiation and Their Effects on Blast Furnace Operation," by C. E. Agnew, STEEL, Nov. 26, Dec. 2, 10 and 17, 1945.

means for classifying various chemical compositions of tapping slag with regard to their mineral composition, from which reasonably accurate indication of thermal conditions within the furnace may be visualized. Since all tetrahedrons are composed of minerals, which are compounds of both acid and base constituents, none are entirely acid or base. However, the effect of the respective acid or base constituents on the mal reactions and requirement· ·an be indicated with the tetrahedron method of slag classification as acid or base constituents predominate in the mineral compounds.

Determines Character of Slag — It might be said the essence of McCaffery's teachings is that ratio of all slag constituents to each other determines the slag character. Generally, as acids (silica and alumina) predominate in slag it will be classified in tetrahedrons Nos. 2, 5 and 6, and as bases (lime and magnesia) predominate it will be classified in tetrahedrons Nos. 7, 8 and 14. However, it should be noted that with certain relation of constituents a seemingly acid slag may have the same thermal effect on furnace operation as a basic slag, and vice versa. Specifically, low silica and high alumina percentages can have the same total as high silica and low alumina percentages but the tetrahedron in which the respective totals would be classified will be determined by the ratio of the respective acids to each other and to the bases, and, by ratio of the respective bases to each other.

The question of "when is a slag basic" has never been satisfactorily answered because of variable action of alumina as an acid or as a base. However, in the interests of practical blast furnace operation thermal effect of slag is the important consideration and it is immaterial whether slag is acid or basic in the usually accepted sense of the terms so long as its thermal effect can be determined. The tetrahedron method of slag classification provides a means for indicating thermal conditions within the furnace and for determining desirable ratios of slag constituents in burden materials; the acid/base method provides means for determining adjustments in fluxing stone weight to meet minor fluctuations in the composition of the slag.

Because tapping slag drains heat from the furnace it is desirable to have it as low in temperature as possible *consistent with thermal requirements in stages of formation preceding the tapping stage.* A seemingly desirable tapping slag temperature can be preceded by undesirable temperatures in the upper and lower bosh. Although acid constituents predominate in Nos. 2, 5 and 6 tetrahedrons, calculation (except with low alumina) indicates more desirable thermal conditions preceding a tetrahedron No. 6 tapping slag (plane of Nos. 4 to 6 magnesia) than occurs with either Nos. 2 or 5 tetrahedron, even though there is little difference in their respective tapping temperatures. Tetrahedron No. 2 tapping slags tend toward high initial formation temperatures; tetrahedron No. 5 tapping slags tend toward relatively low temperatures in the lower bosh; but tetrahedron No. 6 (plane of Nos. 4 to 6 magnesia) tend toward low initial, high lower bosh, and low tapping temperatures.

(To be continued)

Rails and Rail Fittings—Designs Improved

By JOHN R. ZADRA
Assistant Chief Metallurgist
Colorado Fuel & Iron Corp.
Pueblo, Colo.

ADVANCEMENT to the modern streamliners and rail sections of today was not attained at once, but is the result of more than 150 years of thought, ingenuity, hard work and inventive skill of man. During this period, the rail has passed through many changes in design and methods of manufacturing. Railroads were unable to make any notable advancement either in volume of traffic or speed until the rail had first been improved to a point where it could withstand the heavier loads imposed upon it through increased speeds and traffic. Consequently, ever since its inception, rail has been one of the most important factors in the development of the railroads.

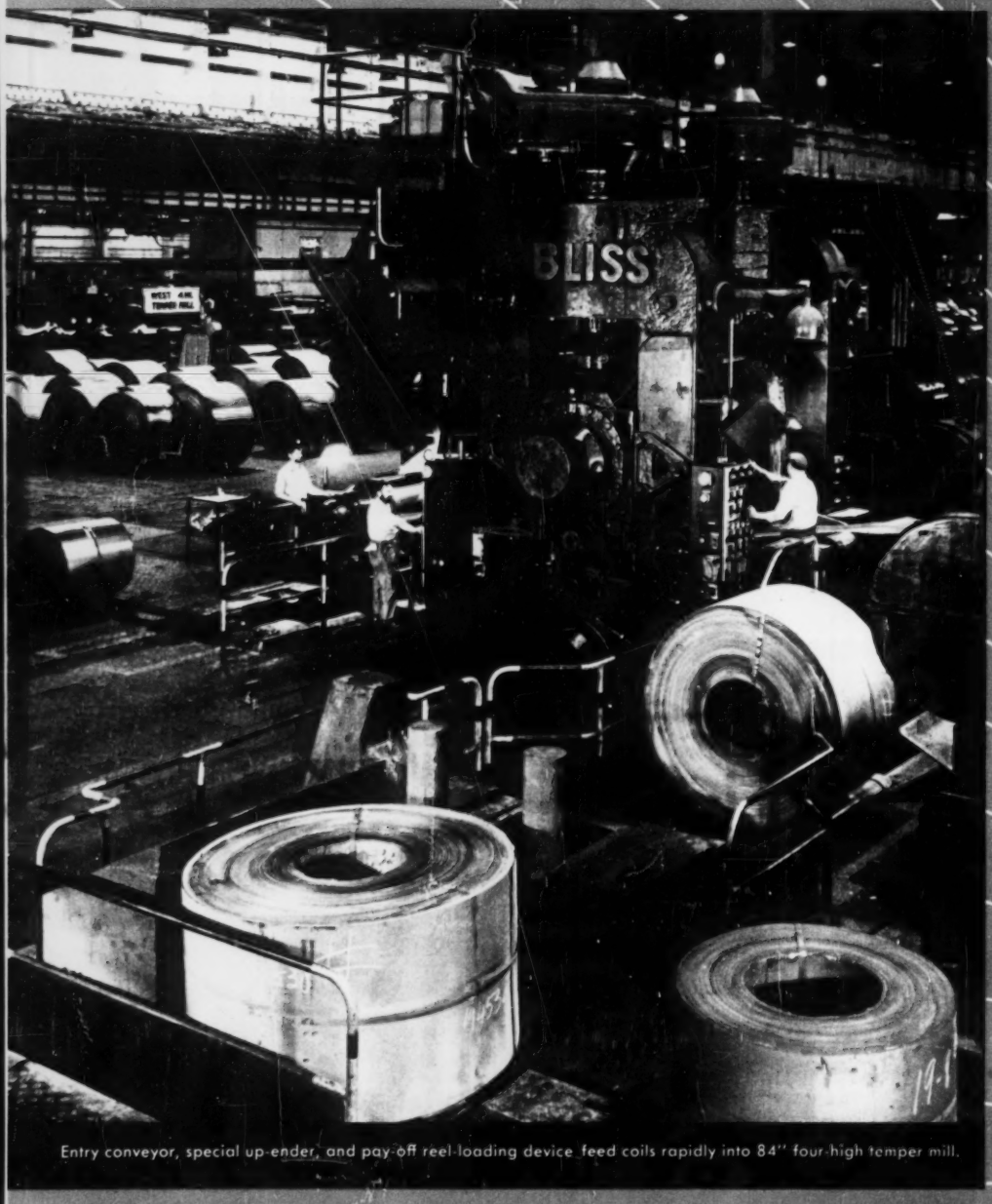
The T-rail, now in general use, was an American invention, being designed by R. L. Stevens in 1830. The first T-rail section was a 39-pound iron rail, and was rolled in England. Even after the introduction of the first T-rail, the English continued changing the design of the chair rail, until the bull head rail was developed and adopted as the British standard in 1905.

Along with the change from bessemer to open-hearth steels, the length of rails increased from 30 to 33 feet and then up to the present day standard of 39 feet. Today the railroads are giving some consideration to the adoption of a 78-foot rail as standard.

In 1907, the American Railway Association appointed a committee to study the new developments and report on the rail sections that would meet with the approval of both the railroads and the rail makers. In 1908, the first American Railway Association series of rail sections were adopted, namely, 60, 70, 80, 90, and 100 pounds per yard, type A and B. With increased speed and heavier traffic, it was natural that heavier rails would follow, and in use in this country today are sections 112, 115, 132, 133, 140 and 155 pounds per yard, as well as other intermediate sections.

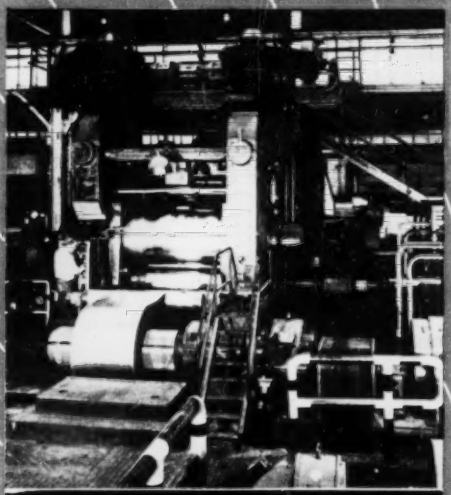
Transverse fissure defect in rail was recognized in 1911 and was one of the major problems that railroads faced up until 1935. The seriousness of the problem led to many laboratory investigations and postulations as to causes for these transverse fissures. Finally in 1918, after much research, the origin of transverse fissure devel-

Revitalized Bliss Four-High Mill



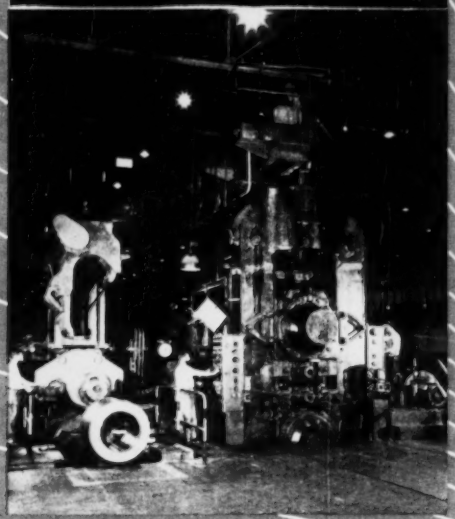
Entry conveyor, special up-ender, and pay-off reel-loading device feed coils rapidly into 84" four-high temper mill.

Delivers 74,000-lb. Coils at 2000 fpm



Massive reel to pay off 74,000 lb. coils is shown on entry side of the mill.

Operator actuates controls to accelerate mill from threading speed to 2000 fpm in eight seconds.



Increased Horsepower and Improved Coil-handling Equipment Raises Production Standards at Gary Sheet and Tin Mill

Yesterday's equipment, even when well designed, is incapable of keeping pace with current production requirements. Recognizing this, engineers at U. S. Steel Company's Gary Sheet and Tin Mill, asked Bliss to recommend equipment and methods to utilize full production capacity of one of their four-high temper mills. Here's how Bliss engineers transformed a 20-year-old mill into a high-speed, modern installation:

- Bliss designed auxiliary reels to handle coils of unprecedented weight—74,000 lbs. in 74" widths.
- Bliss re-powered the mill to deliver at 2000 fpm, and permit faster acceleration/deceleration. This faster pickup—permitting acceleration from threading speed to 2000 fpm in eight seconds—is a significant production step-up.

Engineering new and added life into old equipment is practical and effective. Bliss can point to many successful achievements of this type in steel, brass and aluminum mills. So whether you want to revitalize the old or create the new, it will pay you to consult Bliss. Start now by writing for your copy of our 52-page brochure. It shows how Bliss designed many outstanding installations.

E. W. BLISS COMPANY, *General Office:* CANTON, OHIO
ROLLING MILL DIVISION: SALEM, OHIO
E. W. Bliss (England) Ltd., Derby, England
E. W. Bliss Company (Paris), St. Ouen sur Seine, France

Have you received your copy?
Write on company letterhead for Bliss' 52-page Rolling Mill Brochure.

Remember:
for Presses, ROLLING MILLS and Special Machinery... ***It's Bliss***

opment was found through the revealing of incipient cracks in the rail head, but a solution to the problem was still unknown. Research technicians were then directed to trace the abnormal conditions of the metal in the interior of the rail head to the method of manufacture.

Cause Is Located—Hydrogen in the steel was the primary cause of these incipient cracks, now known as "shatter cracks," and that thermal treatment of the rail by controlled cooling would eliminate the cause of the defect. By 1935, controlled cooling was becoming an accepted practice in the manufacture of rails, and later the American Railway Engineering Association and the American Iron and Steel Institute joint technical committees adopted it as a standard specification for all rails for use in Class I railroads of this country.

During 1941, however, another problem, the shelly rail, confronted the joint committee from the standpoint of two types of rail defects, later defined as "gage corner shelling" and "detail fractures from shelling." The defects first appeared as dark spots, generally located on the top gage corner on the running surface of the high rails on curves, but sometimes occurring on tangent track. In 1945 this problem was recognized as being far more serious than was at first realized. This was due to the fact that while, in some cases, the shelly condition may have been visible, in other instances, fractures of the rail occurred before there was any evidence of shelling of the gage corner running surface of the head. A joint subcommittee on shelly rail was named; and, in collaboration with the University of Illinois and Battelle Memorial Institute, research program was extended.

Results of the various investigations thus far have indicated that these failures are the result of abnormal shearing stresses imposed on the gage corner of the rail by the wheel loads. Following this premise and assuming that the wheel loads could not be reduced, it was obvious that the strength of the rail steel to resist these loads must be increased. This increased strength was accomplished by heat treating normal rail steel and by the development of an alloy steel rail. The heat treated rails were supplied by Bethlehem Steel Co., Steelton Works, and the alloy steel rails by United States Steel Co., Gary Works. Test installations of these heat treated rails and alloy rails were installed recently.

Whether the heat treated or alloy steel rail will prove to be the final solution to the shelly rail problem is as yet unknown, and, in addition, economic considerations of these possible steps must be carefully weighed. Therefore, the Joint Committee on Shelly Rail is stressing investigations into the basic aspects which might cause this type of failure, with a view to reaching an economical and less complicated solution.

Research with regard to rail fittings, particularly rail joint bars, is also conducted at the University of Illinois through the so-called rolling load tests for the purpose of considering the revision of design and specifications. This research project consists of test joints made up of standard rail sections with various sections of heat treated joint bars. These tests simulate as nearly as possible the wheel load bending stresses encountered in track. The criterion for bar failure is taken to be the number of cycles of loading to propagate a fatigue crack.

Tie plate field studies are continually being conducted by the Association of American Railroads research staff in collaboration with tie plate manufacturers. The purpose of this research is to determine the effect of the design of the plates upon the stresses developed under traffic and the rate of mechanical wear of the tie plates into treated soft wood and hard wood ties.

Research in connection with track bolts and nuts is under the auspices of the American Standards Association subcommittee on track bolts in collaboration with the railroads and the manufacturers. The purpose is to determine by tests the dimensions of a nut that are necessary in order to have a stripping strength equal to the bolt, and also to standardize on a minimum number of track bolt and nut sizes.

CALENDAR
OF MEETINGS

January 8, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York. Society address: 11 Broadway, New York.

January 8-10, National Constructors Association: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

January 13-15, Institute of Scrap Iron & Steel: Annual meeting and exhibit, Waldorf-Astoria Hotel, New York. Institute address: 1729 H St., NW, Washington. Executive vice president: Edwin C. Barringer.

January 14-17, American Management Association: General management conference. Biltmore Hotel, Los Angeles. Address: 330 W. 42nd St., New York.

January 14-17, Plant Maintenance Show: Convention Hall, Philadelphia. Manager: Clapp & Poliak Inc. Address: 341 Madison Ave., New York.

January 14-18, Society of Automotive Engineers: Annual meeting & engineering display, Hotel Book-Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 16-17, Steel Shipping Container Institute: Winter meeting, Pierre & Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 16-18, Southern Inustrial Distributors Association: Mid-year meeting, Edgewater Gulf Hotel, Biloxi, Miss. Association address: 208 Peachtree Arcade, Atlanta 3. Secretary: E. L. Pugh.

January 17, American Coke & Coal Chemicals Institute: Western regional meeting, Congress Hotel, Chicago. Institute address: 711 14th St. NW, Washington. Executive secretary: Samuel Weiss.

January 18, Malleable Founders Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

January 18-19, American Medical Association, Council on Industrial Health: Annual meeting, William Penn Hotel, Pittsburgh. Association address: 535 N. Dearborn St., Chicago 18. Secretary: Dr. C. M. Patterson.

January 21-22, Industrial Furnace Manufacturers Association: Mid-winter meeting, Schenley Hotel, Pittsburgh. Association address: 420 Lexington Ave., New York 17. Secretary: V. P. Gopcevic.

January 21-24, American Roadbuilders Association: 50th anniversary meeting, Hotel Rice, Houston. Association address: 1319 F St. NW, Washington 4. Secretary & executive vice president: Lt. Gen. Eugene Reybold.

January 21-25, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

January 23-24, National Industrial Conference Board: Winter meeting, Waldorf-Astoria Hotel, New York. Address: 247 Park Ave., New York 17. Assistant driector, conference division: (Mrs.) I. E. Brown.

January 24-25, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago 5. Secretary: J. Dwight Evans.

January 27-31, Associated Equipment Distributors Association: Annual meeting, Hotel Conrad Hilton, Chicago. Association address: 360 Michigan Ave., Chicago. Secretary: P. D. Herman.

January 28-30, Truck-Trailer Manufacturers Association: Annual meeting, Shamrock Hotel, Houston. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

January 31-February 1, American Society for Metals: Mid-winter meeting, William Penn Hotel, Pittsburgh. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

New Products and Equipment

Fork Lift Series Expanded

USE REPLY CARD—CIRCLE No. 1

Mobilift Corp., 409 S.W. 13th Ave., Portland 5, Ore., announces addition of the H series to its line of gas powered fork lift trucks. Series has two models; the 3000-pound capacity H and the companion HW with 3500-pound capacity. Both are stand-up type. Series features the company's Lev-R-Matic drive, giving operator rapid, simple control of forward-back

. . . 3000 and 3500-pound trucks added

movement, tilting and elevating. Heavier duty multiple-disk clutch of the company's standard design transmits power without manual gear shifting.

Models are powered by 3-cylinder air cooled gas engines and move at maximum governed speed of 6 mph. Both models are available in standard 63 and 83-inch masts. Outside turning radius is 63¾ inches; length without forks is 71 inches; width overall, 38 inches for the model H. Larger model has an outside turning radius of 63⅞ inches and length without fork is 73¼ inches.

Controlled Coal Drying

USE REPLY CARD—CIRCLE No. 2

Uniform, controlled, large scale coal drying can be performed on a dryer developed by Robert Holmes & Bros. Inc., Danville, Ill. Unit is a convection dryer of the forced-draft type. Heat source is an ordinary refractory-type coal-fired furnace. Induced-draft fan draws hot furnace gases from ducts into outer gas chamber and through circular column of coal, vaporizing surface moisture and carrying moisture-laden gases into the center chamber. They are then drawn through the fan and discharged from the exhaust stack to the atmosphere.

Wide range of coal particle sizes, from top stoker to fine, can be dried from maximum surface moisture down to desired moisture content. Capacities per unit range from 15 to 75 tons per hour. Called the Baughman Verti-Vane thermal dryer, installation can be added easily to present drying cleaning plants.

Double Spindle Grinder

USE REPLY CARD—CIRCLE No. 3

Double spindle grinder developed by Gardner Machine Co., Beloit, Wis., precision grinds both flat sides of thin flat parts in one operation. Vertical column is mounted on a sub base and provided with ball bearing ways on which the two grinding heads and head slides move with

. . . grinds both sides in one operation

ease. Heads have tilting feature that allows 23-inch diameter abrasive disks to be set to angle for best grinding results. Hand wheels located at the column's side control head movement. Similar hand wheel actuates the dresser.

Power-driven rotary work carrier is located on the front of the sub base. Guides are provided to locate properly the workpieces as they enter between abrasives and to keep them located properly when leaving. Parts are hand loaded into rotating carrier, unloaded automatically by gravity.

Soldering and Brazing Unit

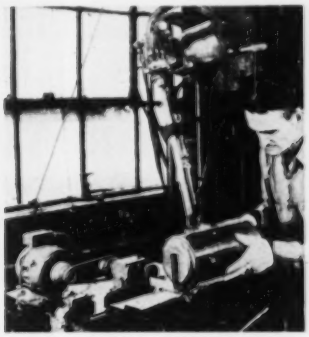
USE REPLY CARD—CIRCLE No. 4

Speeds to 200 lineal feet of seam per minute are obtained on a soldering and brazing unit developed by

REPLY CARDS

on page 77 will bring you more information on any new products and equipment in this section.

Metallurgical Co. of America, 3520 W. Carroll Ave., Chicago 24, Ill. Designated Mogul by the company, gun is adaptable to any type manufacturing where soldering or brazing is required, being suited to special jobs as well as production runs. Gun deposits lead and tin base solder, silver solder and other brazing wires, in liquid or semi-liquid form to a part moving at constant speed under gun nozzle. Operation can be either intermittent or continuous at any de-



. . . attains speeds to 200 lineal fpm

sired rate of speed and in any desired quantity. Material in wire form is fed into the center of a conical flame, where it is melted to a workable state and then deposited.

Electronic Process Control

USE REPLY CARD—CIRCLE No. 5

Miniature all-electronic process control unit is announced by Swartwout Co., 18511 Euclid Ave., Cleveland 12, O. Device is used to regulate the company's Autronic control system. Transmission of information through its system is by electrical means only, making response instantaneous but avoiding use of any moving parts, slide wires or boosters to initiate action.

Controller incorporates functions

of proportion, reset and rate-time integrally. Proportional band is always in operation. Standard proportional band adjustment is from 2 to 200 per cent. Wider ranges are available for special application. Reset adjustment covers range from 0.03 to 20 repeats per minute. Installation of built-in set-point scale is optional. Set-point calibrations can be 0 to 100 per cent linear; 0 to 10 per cent square root.

Switchgear Line Improved

USE REPLY CARD—CIRCLE No. 6

Improved standard line of metal-clad switchgear, in ratings from 2100 to 13,800 v, 150 to 500 mva, is announced by General Electric Co., Schenectady 5, N. Y. Among features incorporated is design of the magne-blast circuit breaker, where a maximum number of parts are made interchangeable among breakers of different ratings. As an example, solenoid mechanisms and several contact and arc extinguisher parts are identical in all ratings. Electromechanical control device is built integral with the breaker mechanism.

Insulating material that has excellent flame-retardant, dielectric and anti-hygroscopic properties is used throughout the breaker. Its use serves to localize damage that might occur under abnormal conditions. Equipment's framework is of completely welded construction. Simplified breaker-elevating mechanism has positive-acting mechanical interlock providing faster raising and lowering of the breaker.

Rectifier Controls Plating

USE REPLY CARD—CIRCLE No. 7

Rectifier that controls small scale plating operations, the Rohco Comet, is offered by R. O. Hull & Co. Inc., 1300 Parsons Court, Rocky River 16, O. Used for plating chromium, bright nickel, zinc, cadmium, brass and copper, it operates on 110 v, 60 cycle ac, single phase input. Its output ranges from 0 to 6 amp at 0 to 18 v; 0 to 30 amp at 0 to 15 v. Ammeter is dual range, 0 to 6 or 0 to 30 amp; voltmeter is single range, 0 to 20 v. Stepless voltage control extends from 0 to full load. Interval timer runs from 0 to 5 minutes, with manual stop, and may be switched in or out of circuit. Dual convenience outlets are available for 110 v accessories.

Dry Photocopies Made Quickly

USE REPLY CARD—CIRCLE No. 8

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill., announces a machine, the Auto-Stat, that can produce dry photocopies almost instantly. Unit is designed to eliminate slower developing-mixing-washing-drying cycle required under normal copying conditions. In regular office use, production of a minimum 100 copies per hour by an experienced operator is attributed to the unit.

The copier will handle letter and legal size papers as well as larger sheets to 11 x 17 inches. Machine is 21 inches long, 8 inches wide and 5 inches high.

Functional Stock Cart

USE REPLY CARD—CIRCLE No. 9

Stock cart that can be used wherever portability of parts or tools is necessary, is offered by Natkin & Co., 1601 S. Hanley Rd., St. Louis 17, Mo. Frame is a completely welded unit; shipping weight is about 60 pounds. The shelves have 1 inch retaining lip on all sides to prevent small parts from rolling off. Legs are punched to accommodate one or two additional shelves. Casters are 3-inch, rubber-tired. Other specifications include a $12\frac{1}{2}$ x $17\frac{3}{4}$ x 4-inch drawer. Height of cart is $33\frac{5}{8}$-inch; depth, 29 inches; width, 18 inches and shelves are 29 x 18 inches.

. . . used where tool portability is needed

Indoor, Outdoor Heat Machine

USE REPLY CARD—CIRCLE No. 10

Fageol Heat Machine Co. 5725 Mt. Elliott Ave., Detroit 11, Mich., offers a 140,000 Btu heat machine for indoor or outdoor use. Designated model PW-140, machine blows warm air out of its base along the floor to "heat men at work—not empty spaces." This heating principle is designed to create a 6-foot-high heat blanket and avoids necessity for warming vast overhead areas in order to keep workers comfortable. In operation, it indicates substantial reduction in heating costs.

Model is built to heat comfortably

ARDCOR **TUBING ROLLS**

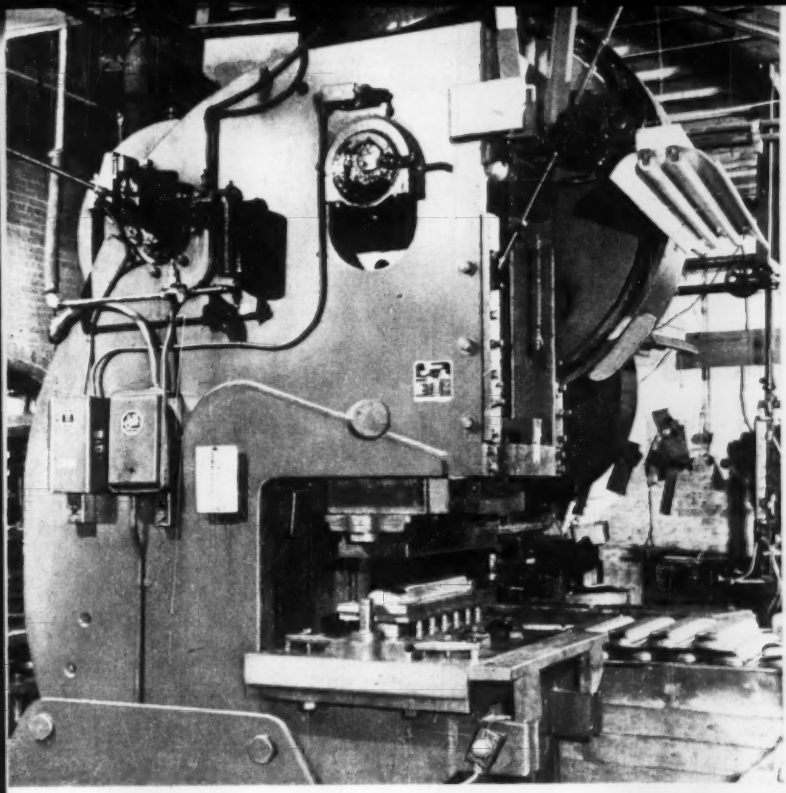
★ These Tubing Rolls, made of ARDCORLOY*—a special alloy steel, were designed and manufactured by ARDCOR for one of America's leading Welded Tube Manufacturers (name on request).
* PRODUCTION PROVEN—30% more footage!

What are YOUR Roll Forming Requirements?

ARDCOR SPECIALTIES

ARDCORLOY ROLLER DIES • ROLL FORMING MACHINERY • CUT-OFF MACHINES

American ROLLER DIE CORPORATION
20700 St. Clair Avenue • Cleveland 17, Ohio



What's YOUR problem?

Wesley L. Tharp, with headquarters in Indianapolis, is the Standard Oil lubrication specialist who recommended STANOSTAMP Compound "C" to this midwest lamp manufacturing company.

Specially trained and experienced Standard Oil lubrication specialists are located in strategic spots throughout the Midwest. There's one near your plant, ready to give you the benefit of his experience.

You can obtain his prompt, on-the-spot service by phoning or writing to your local Standard Oil office. And when the specialist calls on you, ask him about these other fine Standard Oil products.

STANICUT Cutting Oils. These special-duty cutting oils meet today's most exacting requirements and highest production schedules. Grades vary in viscosity and compounding. Each contains the correct proportion of extreme-pressure and friction-reducing ingredients.

STANICOOL HD Soluble Oil. Because of additional compounding, this heavy-duty soluble oil possesses the cooling ability of an emulsion and also gives better tool life and finer finishes than do conventional soluble oils.

STANOLEX Oils. Due to superior wetting ability, these oils are useful on bearings which are inclined to rust during shutdown, or because of high humidity. They are recommended for lubrication of ways and guides on machine tools which are prone to chatter when straight mineral oils are used.

Beats trouble to the draw...

Drawing lamp shades from 20 gauge, cold-rolled steel proved troublesome for the General Lamps Manufacturing Corporation of Elwood, Indiana. Rejections averaged 15%. In addition to this costly scrapping, finish was not satisfactory. It was difficult to remove the die lubricant from the completed shades. Dies had to be polished frequently.

Operators sought a die lubricant which could remedy their production slow-up. Of a number of products tried, STANOSTAMP Compound "C"—the recommendation of a Standard Oil lubrication specialist—gave the best results.

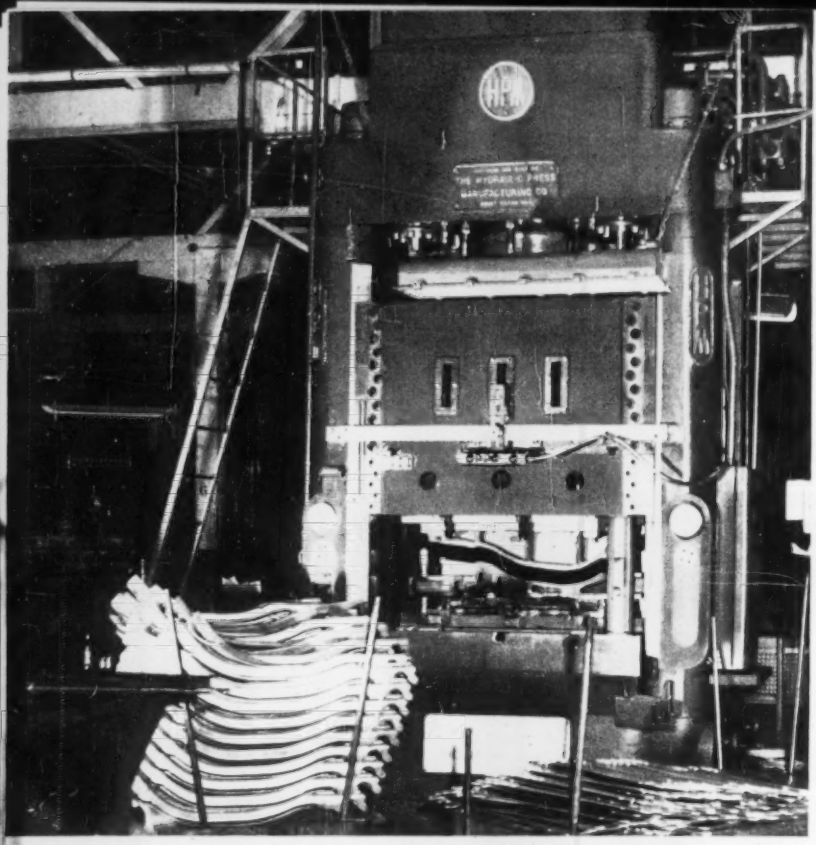
Use of STANOSTAMP "C" has cut rejections from 15% to less than ½%. Excellent finish has been obtained on the shades. Cleaning of dies has taken minimum time and labor. As a result, STANOSTAMP has helped boost production by more than 15%.

Stanostamp
REG. U.S. PAT. OFF.
Compounds

Discuss the advantages of STANOSTAMP Compounds and Standard Oil cutting oils with a Standard Oil lubrication specialist. His headquarters are near your plant. How you can benefit from his services is explained at the right.

Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.

STANDARD **STANDARD OIL COMPANY (INDIANA)**



What's YOUR problem?

D. G. Cripps, of Standard Oil's Grand Rapids, Michigan, office, is the Standard Oil lubrication specialist who recommended STANOIL for use in the hydraulic press shown at the left.

Complete familiarity with job requirements and lubrication applications equips a corps of such Standard Oil lubrication specialists throughout the Midwest to handle similar problems for plant operators.

One of these lubrication specialists is near your plant—ready to give you the benefit of his experience and training. You can obtain his services quickly and easily. Just phone or drop a card to the nearest Standard Oil Company (Indiana) office. Ask the lubrication specialist to explain the benefits of such widely accepted lubricants as:

SUPERLA Greases—Available in all consistency grades, SUPERLA Greases cover a wide range of applications. These products are comparable in quality to the highest type of special greases but are as readily available and economical as ordinary cup greases.

CALUMET Viscous Lubricants—On open gears and wire rope, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and chains, better internal lubrication of wire rope.

STANORUST Rust Preventives—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specifically developed for its intended use. The grades range from a finger print remover to a heavy petrolatum that protects against corrosion for years under the most severe outdoor exposure.

Gain these benefits for your hydraulic operations

The big 400-ton hydraulic press shown above is used to stamp out parts for farm machinery in a big midwest plant.

When the press was first put into operation, plant operators followed the recommendation of a Standard Oil lubrication specialist and used STANOIL Industrial Oil in the hydraulic system. In over four years of continuous hard service, there has been no lost time because of inefficient performance of the hydraulic oil.

Oil capacity of the system is approximately 9 barrels; only 2 barrels make-up per year has been required. The oil in this system has never been changed. It has been centrifuged once to remove moisture which accumulated over three years' operation. Periodic tests of oil samples have shown that STANOIL has maintained its high lubricating quality. A recent analysis showed no increase in viscosity of the oil, no change in color, and a neutralization number of only 0.13 mg. KOH/gm.

You can rely on this unique many-purpose

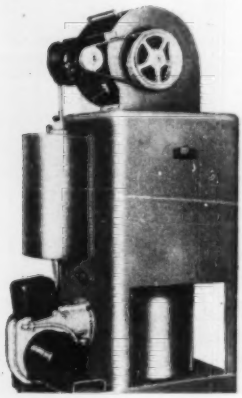
STANOIL
TRADE MARK
Industrial Oil

oil to give you the same clean, dependable service in your plant's hydraulic systems, speed reducers, head stock gears, auxiliary turbines, compressors, and electric motors. You can rely, too, on the expert, on-the-spot service of a Standard Oil lubrication specialist. How you can obtain his help, quickly and easily, is explained at the right.

Standard Oil Company, 910 So. Michigan, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

in areas to 3000 sq ft of confined space or 1600 sq ft of open space. Machine burns regular light grade furnace fuel oil or kerosene. It weighs



. . . heats men at work—not empty spaces

245 pounds and is equipped with wheels to ease portability. Dimensions are 21 x 33 x 58 inches.

All-Weather Cab Assembly

USE REPLY CARD—CIRCLE No. 11

Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill., announces addition of an all-weather cab assembly to its Mercury line of heavy-duty gasoline tractors. Designed for quick field installation, the units can be assembled by two men in about two hours. Twenty-four bolts are used to secure the cab to the tractor frame. Features include shatterproof windshield, 40 x 16 inches; an electric windshield wiper; canvas roll-down curtains; celluloid side and back windows; and 12-gage all steel body.

Drum Clamp Redesigned

USE REPLY CARD—CIRCLE No. 12

Baker Industrial Truck Division, Baker-Raulang Co., Cleveland 2, O., offers an improved version of their drum clamp for fork trucks featuring retaining springs on the clamp's rubber-faced grab plates. These springs keep leading edges of plates out of the way while drums are being positioned in clamp. As drum moves into position, grab plates close around it.

Adjustable Ratchet Rack

USE REPLY CARD—CIRCLE No. 13

Ratchet rack that is adjustable without bolting is introduced by Borroughs Mfg. Division, American Metal Products Co., 5959 Linsdale, Detroit 4, Mich. Rack's design permits height adjustment at 6-inch intervals without bolting. Shelves can be moved by fork truck and inserted between upright posts anywhere on the rack, solving space problems. Three rack models offered by the company are standard, heavy duty and extra heavy duty.

Starter with Fusible Disconnect

USE REPLY CARD—CIRCLE No. 14

A combination across-the-line motor starter with fusible disconnect switch is available from Westinghouse Electric Corp., Pittsburgh 30, Pa., in NEMA sizes O through Z. Designated as class 11-204-N, it consists of a disconnect switch, main line fuse clips and a Life-Linestarter mounted in a common enclosure.

Dry Lubricant Dispenser

USE REPLY CARD—CIRCLE No. 15

Polyethylene bottle, made by Plax Corp., Hartford, Conn., can be used conveniently by machine operators as a dispenser for spraying dry lubricant exactly where it is needed. Bottle will not break, spill or slip and is impervious to contaminating matter. Called Plaxpak, it is equipped with an attached cap that clamps tightly over closure.

Temperature Relief Valve

USE REPLY CARD—CIRCLE No. 16

Automatic reseating temperature relief valve designed to prevent excessive water temperatures in hot water tanks and heaters is announced by McDonnell & Miller Inc., Chicago 18, Ill. Valve is tested, rated and listed by American Gas Association for heat input to 1.2 million Btu per hour. Unit is made with the Vernatherm thermostatic element, adapted for this service.

Nonfoaming Metal Cleaner

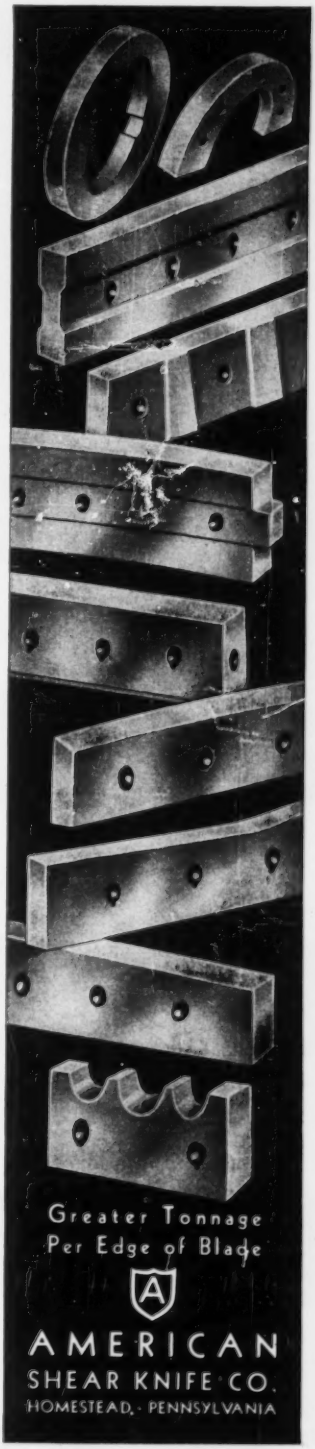
USE REPLY CARD—CIRCLE No. 17

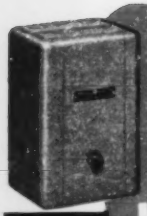
Developed by Kelite Products Inc., Chicago 45, Ill., for use in pressure washer, formula 973 is heavy duty, nonfoaming cleaner for all metals except aluminum and its alloys. Repression powers keep hard water scale from forming and eventually remove old deposits already formed.

Production Soldering Iron

USE REPLY CARD—CIRCLE No. 18

Hexacon Electric Co., Roselle Park, N. J., announces an electric soldering iron for use on production lines where speed is necessary from an iron with

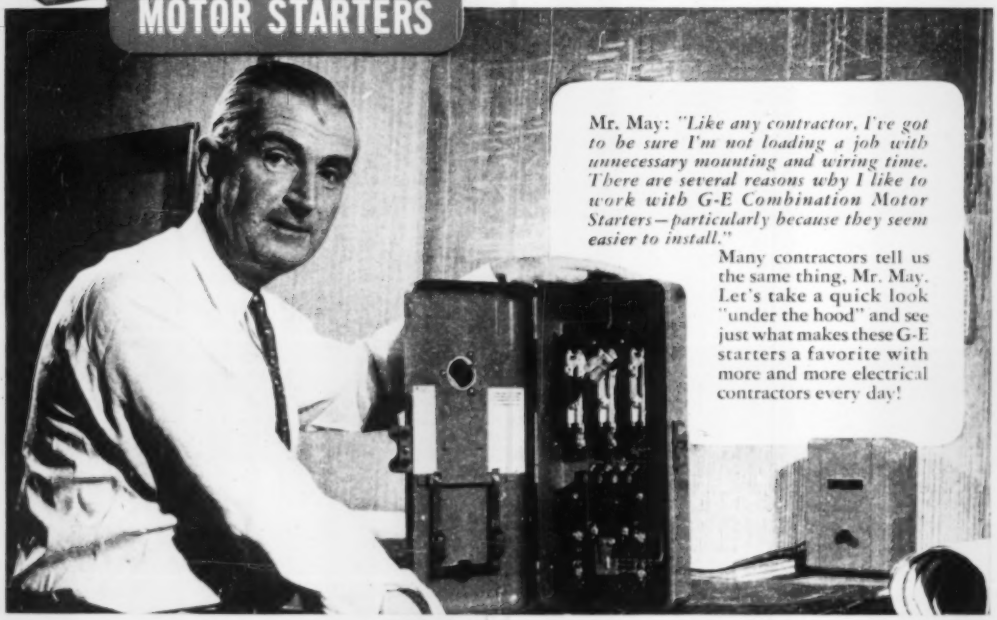




COMBINATION MOTOR STARTERS

...save wiring

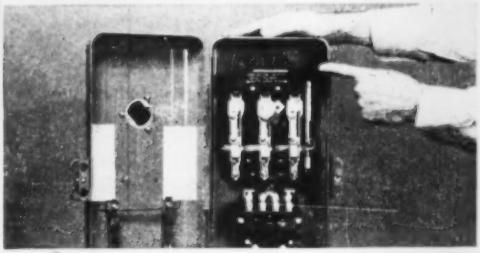
F. G. MAY, ELECTRICAL CONTRACTOR,



Mr. May: *"Like any contractor, I've got to be sure I'm not loading a job with unnecessary mounting and wiring time. There are several reasons why I like to work with G-E Combination Motor Starters—particularly because they seem easier to install."*

Many contractors tell us the same thing, Mr. May. Let's take a quick look "under the hood" and see just what makes these G-E starters a favorite with more and more electrical contractors every day!

1 Mr. May: *"Suppose we start with the mounting. There's a real time-saver!"*
That's right, Mr. May. Both starter and disconnect switch are mounted in one case. Thus, they're installed as a unit! You save wiring time and your customer gets a neater installation!



2 Mr. May: *"Wiring room is mighty important to a contractor."*
Then you should like the layout of this starter. There's plenty of room at top and bottom for line and load wiring. Of course, we take care of wiring the disconnect switch to the starter at the factory.

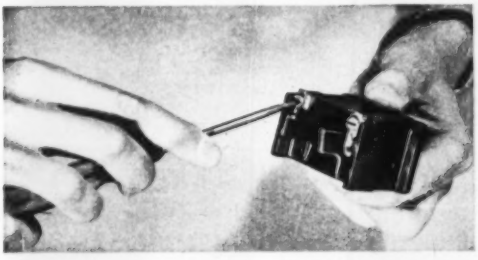
GENERAL ELECTRIC

730-24

time for these 4 reasons

REVEALS THE "REASONS WHY" HE PREFERS G-E COMBINATION STARTERS

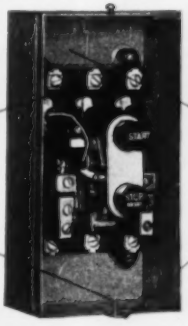
3 Mr. May: *"Having these terminals up front makes them easy to work with!"*
Remember, too, you're working with large pan-head screws. All you do is strip the wires, slide them under the terminal clamps which ride out with the screws, and then tighten. All terminals are big, rugged and permanently anchored.



4 Mr. May: *"I've heard a lot about this coil. What's so different about it?"*
It's completely encased in plastic—so that neither you when installing the starter, nor your customer when servicing it can damage the coil with a slipping screwdriver; and you can assure your customers that these "Strong Box" coils last longer because water, dust and oil are *sealed out!*

G-E Manual Starters ...easier to install, too!

For manual starting of 7½ hp or smaller motors, you can't beat a G-E starter for easy installation, long life. Built to the same rugged specifications as the magnetic starter, it includes many of the same features for quick-wiring:


Front-connected clamp-type terminals up front!
Three-point keyhole mounting.
Plenty of wiring space and straight-through wiring.
Handy knock-outs in top, bottom and sides.

These starters are available with either push-button or toggle-switch operation, and can also be obtained in water-proof, dust-proof, or explosion-proof enclosures . . . 2-, 3-, or 4-pole forms.

G.E. also offers a complete line of control accessories to make operations more automatic . . . more convenient.

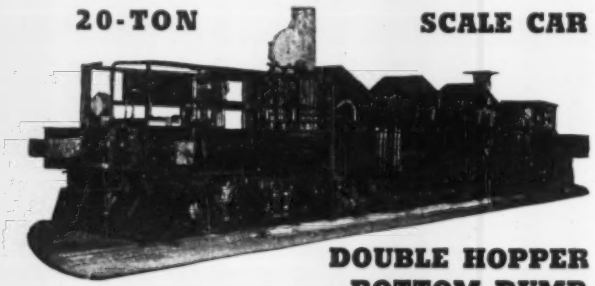
BUY ONE NOW AND COMPARE!

Take any G-E motor starter apart and inspect it. See for yourself why G-E starters last longer, cost less to install, and are easier to maintain than any starters you can buy. Your G-E representative or authorized distributor can supply many models of G-E starters in NEMA sizes 0, 1, 2, and 3 for motors up to 50 hp right from stock for prompt delivery. For more information on magnetic starters, write for Bulletin GEA-5153; manual starters, Bulletin GEA-1522. Section 730-24, General Electric Company, Schenectady 5, N.Y.

ATLAS
Scale Cars

DESIGNED AND ENGINEERED FOR YOUR SPECIFIC NEEDS

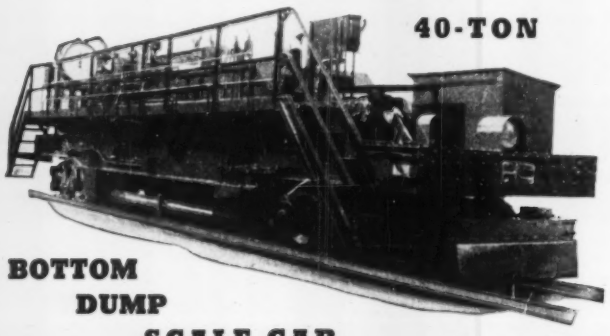
20-TON SCALE CAR



DOUBLE HOPPER BOTTOM DUMP

Car has Atlas underslung suspension scales with Atlas 24" scale Dial with chart recording. Air brakes and air-operated discharge gates. Cast steel side-frame trucks with Roller Bearings.

40-TON



BOTTOM DUMP SCALE CAR

Car has anti-friction bearings throughout, including axle mountings. Car has foot operated "Dead Man" control feature with air brakes inter-locked to apply automatically. Provided with ATLAS all-steel scales and 30" indicating dial. Type printing recorder attachment provides automatic weight registration at skip pit. All standard safety features provided including red marker lights and lights for illuminating the front of the bin.

Atlas Engineering Service is always at your service

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO U. S. A.

small tip diameter. Iron is the plug tip type, rated at 150 w, has ¼-inch tip that reaches temperatures higher than conventional. Its company designation is model P-154.

Speeds Cure Time

USE REPLY CARD—CIRCLE No. 19

Designated as G-E 12853, a phenolic compound that speeds cure time on molded parts is introduced by General Electric's Chemical Division, Pittsfield, Mass. Preheating and mold temperatures can be widely varied to regulate flow.

Electronic Spray Stencil

USE REPLY CARD—CIRCLE No. 20

Complete electronic chassis can be coded quickly for its component parts by spray painting with an electronic spray stencil made by Jas. H. Matthews & Co., Pittsburgh 13, Pa. Stencil holders make it possible to spray both sides of an electronic chassis in one operation. Each unit is made by specification to fit exactly over part to be marked.

Contour Measuring Instrument

USE REPLY CARD—CIRCLE No. 21

Deviation in cam surface, at any angle of arc, can be measured quickly to ten thousandths of an inch with an optical cam rise gage made by Griswold Mfg. Co., Wayne, Pa. For angular measurement, gage is used with dividing head and tail stock to position cam. Linear scale, engraved on contact bar, is graduated from 0 to 3 inches in 50 thousandths of an inch.

Material Repairs Floors

USE REPLY CARD—CIRCLE No. 22

Material for repairing concrete, wood, asphalt or composition floors is offered by Roc-Wood Flooring, Chicago 16, Ill. Hardwood fibers chemically treated and bonded with plastic binder make a smooth, skid-proof surface. Flooring will bind to many substructures without underlayments. Application can be made with a trowel using premixed ingredients and quick hardening permits unlimited use within 24 hours.

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

Helpful Literature

75. Steel Frame Hand Trucks

Fairbanks Co. — Construction data plus full specifications on 9000 series steel-framed hand trucks is presented on 4-page folder. Commander platform, lift jack platform and all steel hand trucks plus four dollie models are described as well. All models are illustrated.

76. Welding Problems File

Eutectic Welding Alloys Corp. — Over 100 pages of illustrated technical data on maintenance and repair welding problems and procedures are included in "1951 Data File of Defense and Maintenance-Conservation Welding Problems." Information on over 160 low temperature welding alloys is also in file.

77. New & Rebuilt Equipment

Electric Equipment Co. — Partial listing of "world's largest inventory" of motors, generator sets, transformers, diesel MG sets, compressors and many other electrical items is included in No. 459 illustrated stock list. Company also buys surplus equipment.

78. Metal Conditioning Process

Klem Chemicals Inc.—"Give Your Metal a Beauty Bath" is title of 4-page illustrated folder dealing with Klem Kote metal conditioning process for cleaning, preparing and rust-proofing metal. Process imparts fine, crystalline tightly adherent, phosphate coating to surface for good paint adhesion and salt spray resistance.

79. Spherical Metal Forming

Pastushin Aviation Corp.—Company's process which effects high savings in time and cost in the spherical forming of jettisonable fuel tanks, practice bombs, skin cowling sections, tail cones and aft fuselage sections is described in 4-page illustrated folder "Forming Metal Faster —at Lower Cost."

80. Automatic Turret Lathes

Potter & Johnston Co.—Automatic turret lathes are subject of 10-page illustrated bulletin 145. Model 3U Speed-Flex machine described is designed for automatic production of small parts. Spindle speeds range from 73 to 1445 rpm. Flexibility is provided by many combinations of speeds and feeds together with six turret faces.

81. Casters & Wheels

Kilbourne & Jacobs Mfg. Co.—First six pages of illustrated caster and wheel catalog No. 117R has information on how to select the right caster and a caster tabular index. Sixteen pages give specifications, general data, line drawings and other information on line of industrial wheels of 170 to 2000 lb capacity and casters from 175 to 850 lb capacity.

82. Electroplating Processes

Hanson-Van Winkle-Munning Co.—Revised, condensed, descriptive literature covering H-VW-M electroplating processes for plating of cadmium, zinc, copper, nickel and silver, along with information on improved methods for lead plating are available. Technical manuals illustrating and describing various processes in detailed form can also be had.

83. Metal Handling Baskets

Hoffman Co.—Line of metal baskets, dippers, strainers and containers used in manufacturing, parts finishing, processing and food industries is cataloged in 4-page illustrated folder. Insert covering special job baskets is included.

84. Cutting Oils & Bases

E. F. Houghton & Co.—Selection of proper straight cutting oil or base for specific operations is aided by 4-page illustrated bulletin "Houghton's Straight Cutting Oils and Bases". Eight popular Cut-Max oils and bases are described and examples of typical dilutions are given.

85. Cylindrical Grinders

Landis Tool Co.—28-pages of illustrated general catalog CG-52 use line sketches to show typical operations that can be performed with each of 22 different types of machines. Brief descriptions and specifications are included for 175 various sizes listed.

86. Industrial Vacuum Cleaner

National Super Service Co.—Super Red Streak model SH heavy duty suction cleaner described in 4-page illustrated bulletin 5110 is adaptable to both wet and dry pick-up. Tool attachments are available which adapt machine to every type of cleaning from floors to boiler tubes.

87. Link V-Belts

Manheim Mfg. & Belting Co.—28-page illustrated bulletin "Veelos—The Link V-Belt" explains how this belting is adjustable to any length and can be adapted to any drive. Information is included for calculating belting for specific drives and how to install belts. Typical applications and resulting advantages are cited.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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HELPFUL LITERATURE

88. Relays & Controls

American Relay & Controls, Inc.—Descriptive of complete line of Amrecon relays with illustrations and data on ten basic alternating and direct current types is 12-page catalog R-10. Snap-action and latching relays, screw-terminal relays, plug-in mountings and hermetically sealed models are also discussed.

89. Metal Forming Machine

Kilham Engineering Inc.—The Bendit metal forming machine which bends, folds, shapes and duplicates intricate as well as simple metal products and components is subject of illustrated catalog 15. Machine reduces need for expensive punches and dies, intricate tooling and special skills.

90. Combustible Gas Analyzer

Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—Instrumentation data sheet 10.15-4a describes a new thermocouple type analyzer which uses Brown ElectroniK potentiometer for combustible gas analysis. Built by Davis Emergency Equipment Co., instruments reduce zero drift to negligible proportions.

91. Hand & Power Lifters

Economy Engineering Co.—32-page brochure No. 940B presents descriptive and illustrative data pertinent to line of hand and electrically powered lifters for handling and stacking wide variety of crates, rolls and barrels. Heavy load lifters range in capacity to 5000 lb, and telescoping type reach up to 49 ft in height. Accessories including barrel dumpers, roller frames and safety devices are covered as well.

92. Drill Presses

Cincinnati Lathe & Tool Co., Canedy-Otto Div.—Single and multiple spindle 16-in. bench and floor model drill presses are described in 8-page illustrated bulletin D-106. Features include six speeds, V-belt drive, full floating spindle, precision bearings and accurate drilling.

93. Gasholders

General American Transportation Corp.—Advantages of Wiggins gasholder, including easy erection, low maintenance cost, trouble-free operation and safe operation, are detailed in 4-page illustrated folder "There Is Only One Gasholder."

94. Chip Separators

McKenzie Engineering Co.—Both floor and bench type chip separators for use with automatic screw machines are covered in two 2-page data sheets. Sizes are available to handle parts ranging from watch and instrument components up to 2-in. diameter by 5-in. long parts at rates to 5000 per minute.

95. Induction Heating

General Electric Co.—Forging, hardening, brazing and annealing applications at 1000, 3000 and 10,000 cycles are described in 12-page illustrated booklet GEA-5679 on equipment for induction heating. It covers components and requirements of induction heating with motor-generator type equipment, plus other uses.

96. Bearing & Shaft Seals

Garlock Packing Co.—100-page illustrated catalog 10 presents detailed information on line of Klozure oil and grease seals for bearings and mechanical pressure seals for rotary shafts. General data, specifications and size and part data for all types are included, along with ordering information.

97. Nonclogging Spray Nozzles

Link-Belt Co.—Latest information on nonclogging spray nozzles for cleaning all types of materials and products is presented in 4-page illustrated folder No. 2386. Nozzles consist of properly shaped bronze deflector which clamps with U-bolt over pipe drilled with hole at each spray location.

98. Tractor Servicing Tools

Owatonna Tool Co.—Hand tools and hydraulically operated pulling tools used for servicing Caterpillar tractors are illustrated and described in 16-page bulletin No. CT-52, along with their attachments and accessories. Utility of tools involves gears, bearings, sleeves, pulleys, shafts, sprockets and bushings.

99. Traveling Cranes

Reading Crane & Hoist Corp.—Hand powered double and single beam traveling cranes are subject of 16-page illustrated bulletin 1007. Brief description of each model, tabulated specifications and line drawings are included. Standard single I-beam models range in capacity from 1 to 10 tons, while double I-beam cranes cover 3 to 20-ton capacities. Design makes it impossible for cranes to get out of square.

100. Grinding Mills

Patterson Foundry & Machine Co.—28-page illustrated catalog No. 514 is entitled "Continuous Grinding." Usable with variety of grinding media, ball, tube and rod mills are adaptable to wet or dry grinding in open or closed circuits and produce output as fine as 10 microns or as coarse as 4-mesh. Complete engineering and application data are included.

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Silent Steam Air Valve

USE REPLY CARD—CIRCLE No. 23

Steam air valve introduced by Taco Heaters Inc., Providence 3, R. I., is made without diaphragm or floats. Air is forced out between special composition disks by steam pressure. Then, as steam enters the valve, moisture causes disks to swell. After valve is satisfied and steam subsides, system becomes a vacuum for a few minutes—after which disks dry, shrink and are ready for another cycle.

Clamp Secures Guy Strands

USE REPLY CARD—CIRCLE No. 24

Hubbard & Co., Pittsburgh 1, Pa., offer a spring clamp designed to hold the loose end of a guy strand firmly to the guy. Its use makes unnecessary previous methods of wrapping with a separate piece of wire or tape. Product is formed from heavy galvanized steel, with belled end. It slips easily over strand's loose end and is tapped into position with any tool.

Carbon Dioxide Recorder

USE REPLY CARD—CIRCLE No. 25

Hays Corp., Michigan City, Ind., announces its CO_2 recorder for determining carbon dioxide percentage in combustion products. Recorder has analyzing section, electrically connected to a remote mounted recording section. It operates on the thermal conductivity principle of gas analysis, thus enabling a record of concentration of several additional gases.

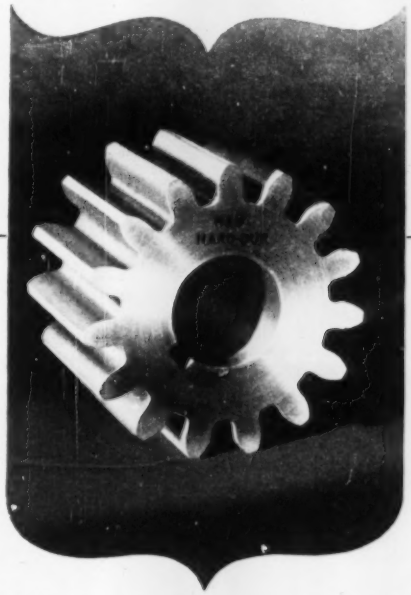
Broken Concrete Restored

USE REPLY CARD—CIRCLE No. 26

Broken concrete floors can be restored quickly with a patch called Instant-Use, made by Flexrock Co., Philadelphia 4, Pa. Industrial floor areas can be used almost immediately after repair. Material is shoveled into hole or rut, tamped and the job is finished. Uses extend from repairs after relocating machinery to complete overlays.

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

when the job is tough . . .



USE "HARD-DUR" GEARS

they preserve the tooth form

• "HARD-DUR" Gears not only preserve tooth form because the material is highly wear resistant and the gears are scientifically heat treated to obtain maximum physical properties...but they have involute teeth that are produced to high standards of accuracy by very careful workmanship. In fact "HARD-DUR" Gears are so much stronger, harder and more wear-resistant, that they are guaranteed to have at least four or five times the life of similar untreated gears...and at only 50% extra in cost.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U. S. A.

Send note on Company Letterhead for 488-Page Catalog 49

for

BORON STEELS

plus values are secured

by Grainal Alloys

Plus values in effectiveness and in uniformity of results are obtained by the production of boron steels with Grainal alloys, for these alloys are composed of boron *plus* other carefully selected elements.

These additional elements . . . by combining with excess nitrogen and oxygen . . . enable the boron to function most effectively and thus consistently secure maximum benefits.

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MAKERS OF ALLOYS

VANCORAM

CHEMICALS AND METALS

The Market Outlook

HOLIDAY lull in metalworking operations eased demand pressure on the steel mills in the closing week of 1951. Many shops were down entirely over the long Christmas weekend, extending from Friday to Wednesday. Most defense plants, however, were an exception in this respect, holding idle time to a minimum. Continuous operations at steel mills, such as blast furnaces and openhearths, were only slightly affected, but steel finishing mills curtailed noticeably. Much the same situation is indicated for the New Year's weekend so far as metalworking is concerned, but steel mill operations beginning Jan. 1 will hinge on developments with respect to the threatened industry-wide strike. Preparations were made during Christmas week to close down facilities in event a work stoppage at the turn of the year proved unavoidable. Where possible, steelmakers utilized idle time over Christmas to make much needed equipment repairs.

SUPPLIES—Strong demand for all classes of steel products is indicated well into the new year. The military and related defense take alone will run to 40 per cent of carbon steel supply in first quarter, estimated at 19,385,000 product tons. In some items, such as alloy and stainless steels, structurals and plates, defense requirements will run still higher. Peak defense order load still is months distant so that no particular easing in supply conditions is in prospect for the immediate future. Generally, however, with consumer durable goods manufacture curtailed, and more steelmaking capacity scheduled for completion soon, the view is spreading in the markets that many products now in short supply will be available in much more satisfactory volume by mid-1952. This, of course, is dependent upon avoidance of a costly steel strike and serious production losses because of scrap shortage. Some steel authorities predict signs of supply-demand balance in some products will appear in first quarter.

PRODUCTS—While first quarter tonnage is virtually sold out, curtailment in civilian goods production has definitely eased demand pressure for sheets and strip. This easing, especially noticeable in cold-rolled and electrical sheets, is being offset to some extent by diversion of additional rolling time on continuous mills to production of light plates. Nevertheless, trade authorities are of the opinion the light, flat-rolled products will be in relatively easy supply by midyear at latest, especially with substantial new rolling capacity scheduled for early completion. Fulfillment of many emergency requirements for structural steel and reinforcing bars is indicated early in 1952, thus releasing substantial production to normal consumption outlets. Expectations are alloy steel, carbon bars, oil country pipe, and plates will continue hard to get throughout 1952.

CONTROLS—Pending better demand-supply balance in steel than at present, there is little chance government controls will be relaxed soon. Actually, further tightening and extension of regulations can be expected as new developments arise attending distribution for defense programs under the Controlled Materials Plan. Example of this is the recent reclassification of 10 Class B steel products as controlled materials beginning first quarter, 1952. These items, including die blocks, roofing, siding, nails and staples, wire rope and strand, wire netting and wire mesh, now come under complete allocation like all basic steel, copper and aluminum materials under the Controlled Materials Plan. Reclassification was made because of tightness in supply and to assure defense requirements would be cared for.

PRICES—Steel and related product prices are unchanged at levels frozen by the government last January. For the most part these prices have been in effect since December, 1950, when most producers announced new schedules. Future trend of prices is uncertain, being tied in with the wage issue and therefore dependent on government policy still to be definitely determined. Currently, steel warehouses are putting new price lists into effect under CPR 98.

NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Dec. 29†	Change	Same Week 1950	Same Week 1949
Pittsburgh	97.5	— 1.5*	98	96.5
Chicago	104	— 3	100	96
Mid-Atlantic	101.5	+ 0.5	91	78
Youngstown	101	0	106	102
Wheeling	98.5	— 4.5	97	96.5
Cleveland	104	— 2.5	94.5	95.5
Buffalo	104	0	104	103.5
Birmingham	104	— 1	100	100
New England	89	+ 1	89	81
Cincinnati	77	— 24	88	104
St. Louis	87	0	81.5	84.5
Detroit	100	— 10	103.5	98
Western	103	— 0.5	96	87
Estimated national rate	102	— 2.5	98	93.5

Based on weekly steelmaking capacity of 1,969,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week. † Estimated.

The Metalworking Outlook—p. 15 Production-Engineering News—p. 51

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Dec. 27 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	171.92	171.92	171.92	167.67	112.82
Index in cents per lb.	4.657	4.657	4.657	4.545	3.056

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32	$106.32	$106.32	$103.50	$64.91
No. 2 Fdry, Pig Iron, GT	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	45.50	31.08

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 27 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.96
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.90	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.50
Plates, Chicago	3.70	3.70	3.70	3.70	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.335
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.25	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.50-4.90	3.20
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.335
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts.(NT)	$66.00	$66.00	$66.00	$66.00	$47.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.55

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	31.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Del, Phila.	57.11	57.11	57.11	56.89	32.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.58	30.94
Malleable Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts.	$44.00	$44.00	$44.00	$46.50	$32.50
No. 1 Heavy Melt, E. Pa.	42.50	42.50	42.50	45.00	30.75
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	45.00	30.00
No. 1 Heavy Melt, Valley	44.00	44.00	44.00	46.25	32.50
No. 1 Heavy Melt, Cleve.	43.00	43.00	43.00	45.75	32.50
No. 1 Heavy Melt, Buffalo	43.00	43.00	43.00	44.88	29.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	67.00	34.75
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	62.00	40.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.75	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	17.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	12.35
Tin, New York	103.00	103.00	103.00	150.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	32.00	28.25
Nickel, refinery, duty paid	56.50	56.50	56.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
AlabamaCity, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.00	57.50	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O. del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SIVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SIVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Dec. 27, 1951; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$76.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2 ..56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ..85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R3,U5,W14..70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown R2, U5 ..3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y. B11..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand., Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....5.90
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.80
So.Chicago,Ill. U5, W14..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flanges
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....5.65
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ..4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif. (30) K1 ..4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah G1 ....3.70
Harrisburg,Pa. C5 ....6.30
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.90
So.Chicago,Ill. U5, W14..3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1..3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah G1 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.85
Seattle B3, N14 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.85
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2, U5, W14..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12, R3..4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.50
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A 7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. F7 ....4.55
Hammond,Ind. L2, M13 ..4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....4.55
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ....5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M13 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.40
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.45
Detroit P17 ....5.50
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13..5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.40
So.Chicago,Ill. R2, W14..5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(28) T4..4.85
Huntngtn,W.Va.(3) W7 ..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover,(Wrgh.Iron) U1..12.25
Economy,Pa. (S.R.) B14..9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5..14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Sharon,Pa. S3 ....4.00
So.Chicago,Ill. W14 ....3.80
SparrowsPoint,Md. B2 ..3.80
Steubenville,O. W10 ....3.90
Torrance,Calif. C11 ....4.30
Warren,O. R2 ....3.80
Weirton,W.Va. W6 ....3.80
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.80

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover,O. R1 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 ....5.65
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ..5.45
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint (36) B2..5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ....6.55
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2..6.55
Warren,O. R2 ....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvanneaied Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

TIN PLATE, Electrolytic (Base Box)

	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	....	....	7.25	8.50	9.50
Brackenridge,Pa. A4	....	....	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	....	....	7.95	9.20	....
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	....	....
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	....	6.75	7.25	....	....
Vandergrift,Pa. U5	....	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	....	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	....
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	....
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	....
SparrowsPt, B2	5.60	....
Torrance,Cal. C11	6.35	....

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.30
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(23) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C5 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C5	5.25

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	....	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	....	....	7.70	9.65	....
Carnegie,Pa. S18	....	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.55	....	....
Detroit D2	5.60	6.65	7.25	....	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	....	....	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	....	....
NewYork W3	....	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS; Cleve.orPitts.Base	....	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	....	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.40	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	....	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	....	....	10.30	12.50	15.35
Harrison,N.J. C18	....	....	10.30	12.50	15.35
NewYork W3	....	....	10.30	12.50	15.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fritez-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt, Conn. (10)	$15 10.75
Carnegie, Pa. S1S	....10.60
Cleveland A7	.....10.00
Dover, O. G6	.....10.50
Fontana, Calif. K1	...11.65
Harrison, N.J. C1S	....10.60
Midland, Pa.	...C1S ...10.60
NewBritn, Conn. (10)	$15 10.75
Pawtucket, R.I. (11)	N8.10.75
Pawtucket, R.I. (12)	NS..11.05
Sharon, Pa. S3	.....10.60
Worcester, Mass. A7	..10.30
Youngstown C8	.....10.60

STRIP, Hot-Rolled Ingot Iron

Asland, Ky. (8) A10	..3.75
Warren, O. R2	.....4.10

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	.....5.25

TIGHT COOPERAGE HOOP

Atlanta A11	.....4.05
Riverdale, Ill. A1	....3.90
Sharon, Pa. S3	.....4.15
Youngstown U5	.....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora, Pa. A7	5.70	6.15
Duluth, Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston, Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet, Ill. A7	5.70	6.15
KansasCy, Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	4.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts., Calif. C11	6.65	6.80
Prtsmth. (18) P12	6.10	6.60
Rankin A7	5.70	6.15
So. Chicago R2	5.70	5.95
So. S. Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling, Ill. (1) N15	5.70	6.15
Struthers, O. Y1	5.70	6.15
Torrance, Cal. C11	6.65	...
Worcester A7	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton, Ill. L1	8.65	8.90
Bartonville, Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria, O. S1	8.55	9.10
Johnstown, Pa. B2	8.55	8.80
Monessen, Pa. P16	8.55	8.80
Monessen, Pa. P7	8.80	9.05
Palmer, Mass. W12	8.55	9.10
Portsmouth, O. P12	8.55	8.80
Roebling, N.J. R5	8.55	8.80
SparrowsPt. B2	8.65	8.90
Struthers, O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2	...4.85
Aliquippa, Pa. J5	.....4.85
Atlanta A11	.....5.10
Alton, Ill. L1	.....5.05
Bartonville, Ill. (1) K4	..4.85
Buffalo W12	.....4.85
Chicago W13	.....5.10
Cleveland A7, C20	....4.85
Crawfordsville, Ind. MS	.5.10
Donora, Pa. A7	.....4.85
Duluth, Minn. A7	.....4.85
Fairfield, Ala. T2	.....4.85
Fostoria, O. (24) S1	....5.35
Houston S5	.....5.25
Johnstown, Pa. B2	.....4.85
Joliet, Ill. A7	.....4.85
KansasCity, Mo. S5	.....5.45
Kokomo, Ind. C16	.....4.95
LosAngeles B3	.....5.80
Minnequa, Colo. C10	....5.10
Monessen, Pa. P7	.....5.10
Newark, 6-8 ga. I-1	...5.50
No. Tonawanda, B11	....4.85
Palmer, Mass. W12	.....5.15
Pittsburg, Calif. C11	....5.80
Portsmouth, O. P12	.....5.25
Rankin, Pa. A7	.....4.85
So. Chicago, Ill. R2	.....4.85
So. SanFrancisco C10	...5.80
SparrowsPoint, Md. B2	.4.95
Sterling, Ill. (1) N15	....4.85
Struthers, O. Y1	.....4.85
Torrance, Calif. C11	....5.80
Waukegan, Ill. A7	.....4.85
Worcester, Mass. A7, T6	.5.15

WIRE, Cold-Rolled Flat

Anderson, Ind. G6	.....6.20
Buffalo W12	.....6.35
Cleveland A7	.....5.85
Crawfordsville, Ind. MS	..6.20
Detroit D2	.....6.20
Dover, O. G6	.....6.20
Fostoria, O. S1	.....6.00
Kokomo, Ind. C16	.....5.70
Franklin Park, Ill. T6	...6.20
Massillon, O. R8	.....5.85
Monessen, Pa. P16	.....5.85
Monessen, Pa. P7	.....6.10
NewHaven, Conn. D2	...6.50
Pawtucket, R.I. (12) NS	..6.85
Trenton, N.J. R5	.....6.15
Worcester, Mass. A7	.....6.15
Worcester, Mass. T6	.....6.50
Worcester, Mass. W12	...6.65

WIRE, Galv'd ACSR for Cores

Bartonville, Ill. K4	.....8.50
Monessen, Pa. P16	.....8.50
Roebling, N.J. R5	.....8.80
SparrowsPoint, Md. B2	..8.60
Johnstown, Pa. B2	.....8.50

WIRE, Tire Bead

Bartonville, Ill. (1) K4	..10.90
Monessen, Pa. P16	....11.40
Roebling, N.J. R5	....11.55

WIRE (16 gage)	**An'ld Galv.**	**Stone**	**Stone**
Aliquippa J5	10.15	12.15	
Bartonville (1) K4	10.25	11.95	
Cleveland A7	10.25	12.15	
Crawfrdsville MS	10.30	12.00	
Fostoria, O. S1	10.40	13.00	
Johnstown B2	10.25	12.15	
Kokomo C16	10.25	11.95	
Minnequa C10	10.40	12.40	
Palmer, Mass. W12	10.25	12.15	
Pitts. Cal. C11	10.60	12.50	
Prtsmth. (18) P12	10.55	12.50	
SparrowsPt. B2	10.35	12.25	
Waukegan A7	10.25	12.15	

WIRE, MB Spring High Carbon

Aliquippa, Pa. J5	.....6.25
Alton, Ill. L1	.....6.45
Bartonville, Ill. (1) K4	..6.25
Buffalo W12	.....6.25
Cleveland A7	.....6.25
Donora, Pa. A7	.....6.25
Duluth, Minn. A7	.....6.25
Fostoria, O. S1	.....6.25
Johnstown, Pa. B2	.....6.25
LosAngeles B3	.....7.20
Milbury, Mass. (12) N6	.8.05
Monessen, Pa. P7, P16	.6.25
Palmer, Mass. W12	.....6.55
Pittsburg, Calif. C11	....7.20
Roebling, N.J. R5	.....6.55
Portsmouth, O. P12	.....6.25
So. Chicago, Ill. R2	.....6.25
So. SanFrancisco C10	...7.20
SparrowsPoint, Md. B2	.6.35
Struthers, O. Y1	.....6.25
Trenton, N.J. A7	.....6.55
Waukegan, Ill. A7	.....6.25
Worcester A7, T6, W12	.6.55
Worcester, Mass. J4	....6.75

WIRE, Fine & Weaving (8" Coils)

Bartonville, Ill. (1) K4	..8.90
Buffalo W12	.....8.90
Chicago W13	.....8.90
Cleveland A7	.....8.90
Crawfordsville, Ind. MS	..8.95
Fostoria, O. S1	.....8.90
Johnstown, Pa. B2	.....8.90
Kokomo, Ind. C16	.....8.90
Monessen, Pa. P16	.....8.90
Palmer, Mass. W12	.....9.20
Portsmouth, O. P12	.....8.90
Roebling, N.J. R5	.....9.20
Waukegan, Ill. A7	.....8.90
Worcester, Mass. A7	T6.9.20

WIRE, Barbed	**Col.**
AlabamaCity, Ala. R2	...137
Aliquippa, Pa. J5	141
Atlanta A11	144
Bartonville, Ill. (19) K4	144
Crawfordsville, Ind. MS	..146
Donora, Pa. A7	141
Duluth, Minn. A7	141
Fairfield, Ala. T2	141
Houston, Tex. S5	149
Johnstown, Pa. B2	141
Joliet, Ill. A7	141
KansasCity, Mo. S5	153
Kokomo, Ind. C16	143
Minnequa, Colo. C10	147
Monessen, Pa. P7	146
Pittsburg, Calif. C11	147
Portsmouth, O. (18) P12	..148
Rankin, Pa. A7	141
So. Chicago, Ill. R2	137
So. SanFran., Calif. C10	..161
SparrowsPoint, Md. B2	..143
Sterling, Ill. (1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity, Ala. R2	...123
Atlanta A11	126
Bartonville, Ill. (19) K4	123
Crawfordsville, Ind. MS	..132
Donora, Pa. A7	123
Duluth, Minn. A7	123
Fairfield, Ala. T2	123
Joliet, Ill. A7	123
KansasCity, Mo. S5	135
Kokomo, Ind. C16	125
Minnequa, Colo. C10	128
Pittsburg, Calif. C11	147
So. Chicago, Ill. R2	123
So. SanFran., Calif. C10	..147
SparrowsPoint, Md. B2	..125
Sterling, Ill. (1) N15	123

WIRE, Upholstery Spring

Aliquippa, Pa. J5	.....5.90
Alton, Ill. L1	.....6.10
Buffalo W12	.....5.90
Cleveland A7	.....5.90
Donora, Pa. A7	.....5.90
Duluth, Minn. A7	.....5.90
Johnstown, Pa. B2	....5.90
LosAngeles B3	.....6.85
Monessen, Pa. P7, P16	.5.90
NewHaven, Conn. A7	..6.20
Palmer, Mass. W12	....6.20
Pittsburg, Calif. C11	...6.85
Portsmouth, O. P12	....5.90
Roebling, N.J. R5	.....6.20
So. Chicago, Ill. R2	....5.90
So. SanFrancisco C10	...6.85
SparrowsPoint, Md. B2	..6.00
Torrance, Calif. C11	...6.85
Trenton, N.J. A7	.....6.20
Waukegan, Ill. A7	.....5.90
Worcester, Mass. A7	....6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity, Ala. R2	...127
Ala. City, Ala., 17-18ga. R2	214
Aliquippa, Pa. 9-14½ ga. J5	131
Atlanta A11	134
Bartonville, Ill. (19) K4	..131
Crawfordsville, Ind. MS	..133
Donora, Pa. A7	131
Duluth, Minn. A7	131
Fairfield, Ala. T2	131
Houston, Tex. S5	139
Johnstown, Pa. B2	131
Johnstown, 17ga., 6" B2	..205
Johnstown, 17ga., 4" B2	..208
Joliet, Ill. A7	131
KansasCity, Mo. S5	143
Kokomo, Ind. C16	133
Minnequa, Colo. C10	139
Monessen, Pa. P7	136
Pittsburg, Calif. C11	154
Portsmouth, O. (18) P12	..138
Rankin, Pa. A7	131
So. Chicago, Ill. R2	127
Sterling, Ill. (1) N15	131

FENCE POSTS

ChicagoHts., Ill. C2	140
Duluth, Minn. A7	125
Franklin, Pa. F5	140
Huntington, W. Va. W7	140
Johnstown, Pa. B2	140
Marion, O. P11	140
Minnequa, Colo. C10	130
Moline, Ill. R2	136
So. Chicago, Ill. R2	140
Tonawanda, N.Y. B12	140
Williamsport, Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity, Mo. S5	....9.85
Lebanon, Pa. (31) B2	...9.85
Minnequa, Colo. C10	....9.85
Pittsburgh O3, P14	....9.85
Seattle B3	.....10.33

RAILS

Bessemer, Pa. U5	.....
Ensley, Ala. T2	.....
Fairfield, Ala. T2	.....
Gary, Ind. U5	.....
Huntington, W. Va. W7	.....
Ind. Harbor, Ind. I-2	.....
Johnstown, Pa. B2	.....
Lackawanna, N.Y. B2	....
Minnequa, Colo. C10	....
Steelton, Pa. B2	.....
Williamsport, Pa. S19	....

NAILS & STAPLES, Stock To dealers & mfgrs. (7)

	Col.
AlabamaCity, Ala. R2	...118
Aliquippa, Pa. (13) J5	...118
Atlanta A11	121
Bartonville, Ill. (19) K4	...118
Chicago, Ill. W13	118
Cleveland A9	125
Crawfordsville, Ind. MS	..122
Donora, Pa. A7	118
Duluth, Minn. A7	118
Fairfield, Ala. T2	118
Galveston, Tex. D7	126
Houston, Tex. S5	126
Johnstown, Pa. B2	118
Joliet, Ill. A7	118
KansasCity, Mo. S5	130
Kokomo, Ind. C16	120
Minnequa, Colo. C10	123
Monessen, Pa. P7	124
Pittsburg, Calif. C11	137
Portsmouth, O. P12	124
Rankin, Pa. A7	118
So. Chicago, Ill. R2	118
SparrowsPoint, Md. B2	..120
Sterling, Ill. (1) N15	118
Torrance, Calif. C11	138
Worcester, Mass. A7	124

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken, Pa. A3	$7.35
Wheeling, W. Va. W10	..7.35

TIE PLATES

Fairfield, Ala. T2	.....4.50
Gary, Ind. U5	.....4.50
Ind. Harbor, Ind. I-2	...4.50
Lackawanna, N.Y. B2	...4.50
Minnequa, Colo. C10	...4.50
Pittsburg, Calif. C11	...4.65
Seattle B3	.....4.65
Steelton, Pa. B2	.....4.50
Torrance, Calif. C11	....4.65

JOINT BARS

Bessemer, Pa. U5	.....4.70
Fairfield, Ala. T2	.....4.70
Ind. Harbor, Ind. I-2	...4.70
Joliet, Ill. U5	.....4.70
Lackawanna, N.Y. B2	...4.70
Minnequa, Colo. C10	...4.70
Steelton, Pa. B2	.....4.70

STANDARD TRACK SPIKES

Ind. Harbor, Ind. I-2, Y1	6.15
KansasCity, Mo. S5	...6.40
Lebanon, Pa. B2	.....6.15
Minnequa, Colo. C10	....6.15
Pittsburgh J5	.....6.15
Seattle B3	.....6.65
So. Chicago, Ill. R2	....6.15
Struthers, O. Y1	.....6.15
Youngstown R2	.....6.15

AXLES

Ind. Harbor, Ind. S13	....5.60
Johnstown, Pa. B2	....5.60

	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
	3.60	3.50	3.55	4.00
	3.60	3.50	...	4.00
	...	...	...	4.00
	3.60	3.50	3.55	...
	...	...	...	5.00
	3.60	3.50	3.55	...
	...	...	...	(16) 4.00
	3.60	3.50	...	4.00
	3.60	3.50	...	4.50
	3.60	3.50	...	...
	...	...	...	4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Anaylsis

W	Cr	V	Co	
18	4	1	....	1.505
18	4	2	....	1.650
20	25	4	25	3.535-3.675
19	4	2	7	2.460
18	25	4	25	1 2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, and V3.

Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) 8" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 16" wide.
(24) Deduct 0.2lc, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Refurbished.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 9.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb., Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv., Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

On the job!

Our volunteer speakers are saving thousands of lives *today* . . . in factories and business offices . . . at neighborhood and civic centers . . . at social, fraternal and service group meetings all over this land . . . by showing people what they can do to protect themselves and their families against death from cancer.

In laboratories and hospitals, from coast to coast, our volunteer dollars are supporting hundreds of research and clinical projects that will save countless more lives *tomorrow*.

To find out what you yourself can do about cancer, or if you want us to arrange a special educational program for your neighbors, fellow-workers or friends, just telephone the American Cancer Society office nearest you or address your letter to "Cancer" in care of your local Post Office. One of our volunteer or staff workers will be on the job to help you.

American Cancer Society

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	44.0	41.0	20.5	22.5	19.5
1½	27.5	2.78	42.5	41.5	41.5	21.5	20.0	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif., K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2" 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1⅝	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base 20%	Strip Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302	....	....	....	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	....	....	....	24.50	27.50-27.77	77.00
309	30.50	35.00	....	....	....	....	....	....
310	36.50	41.00	....	....	....	....	....	144.00
316	29.50	34.00	....	....	....	26.00	35.92-36.50	....
317	34.50	39.00	....	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....	....
321	26.50	31.00-32.00	....	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	....	24.00	33.50-33.83	130.00
405	21.25	27.75	....	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....	....
Inconel	41.23	54.18	....	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	16.5	6.5
¾-in.-1⅛-in.	12	2
1⅛-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)	Reg.	Hvy.
½-in. & smaller..	35	28.5
⅝-in. & ⅝-in. ..	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger.	13	8.5
		Light
⅞-in. & smaller	....	35
1⅛-in. to ⅝-in.	....	28.5
¾-in. to 1½-in.	....	26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger..	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.85c
⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.
Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam.—Inches	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.75	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Bait., Types 301-347 sheet, except 303 and 309 E2.
Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.
Bridgeville, Pa., bars, wire, sheets & strip U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.
Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.
Cleveland, strip A7.
Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 32.00c, 347; 30.50c, 410; 31.00c, 430.
Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.
Duquesne, Pa., bars U5.
Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.
Gary, Ind., sheets except Type 416 U5.
Harrison, N. J., strip and wire C18.
Massillon, O., all items, R2.
McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.
McKeesport, Pa., bars, sheets except Type 416 U5.
Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars U5.
Pittsburgh, sheets C18.
Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.
Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.
So. Chicago, Ill., bars & structurals U5.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars, U4.
Wallingford, Conn., strip, W2 quotes 0.25c higher.
Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.
Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.
Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.
Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xylol ..25.00-33.50
Per ton bulk, ovens
Sulphate of ammonia $32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots..	17.00
Swedish, c.i.f. New York, in bags..	$.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	$3.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	$3.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

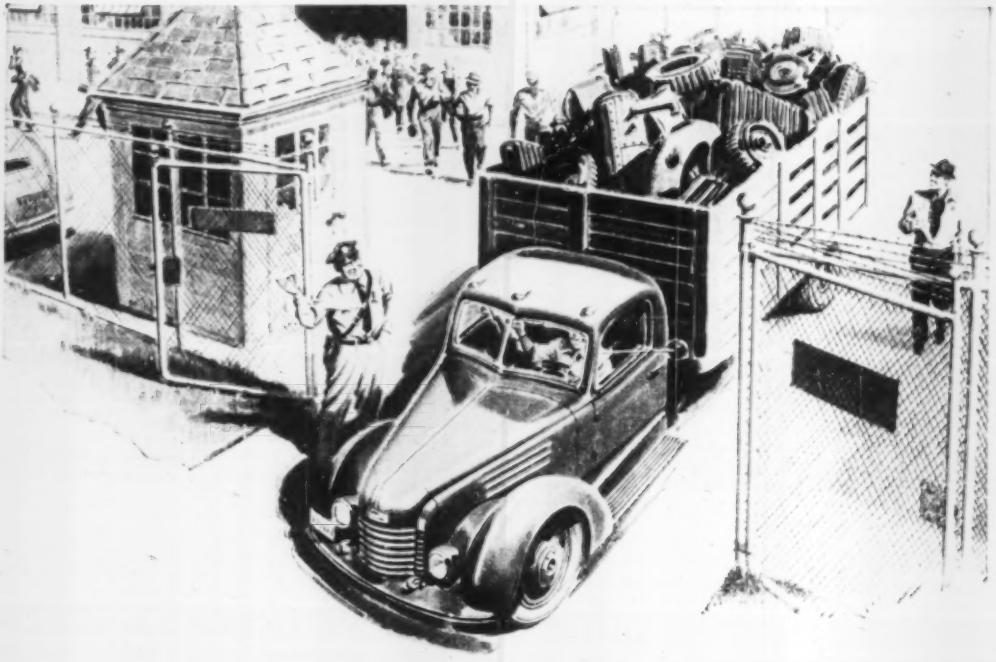
BEEHIVE OVENS

Connellsvill,fur.	$14.50-15.00
Connelsvill,fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J. ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Neville Island, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.



Scrap's valuable!.. Scrap's precious!

It's needed . . . badly . . . to maintain vital steel production.
Every plant has some—search out the iron and steel scrap in yours

Among the *most-needed* industrial commodities, today, is *junk*.

Yes—junk iron and steel, called *scrap*.

One half of the ingredients in making new steel is *old* iron and steel—collected from the waste of metal-working and from obsolete products made of steel.

6,000,000 EXTRA TONS NEEDED

Today, not enough scrap is being obtained from *normal* sources to meet the demand of increased steel production.

We must get *more* scrap from other sources. One of these sources may very well be *your* place of business.

HERE'S WHAT'S NEEDED

For help in this emergency, search your place for scrap; specifically: obsolete machinery and equipment . . . no-longer-used jigs and fixtures . . . worn-out or broken chain, wheels, pulleys, gears, pipe, etc. . . . abandoned metal structures.

If it's gathering rust or dust, it may be scrap—and more valuable being remade into steel than cluttering up your premises.

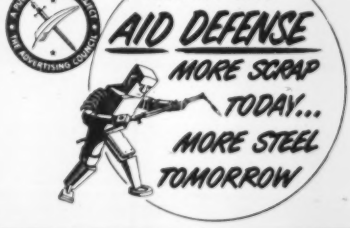
Write for booklet, "Top Management: Your Program for Emergency Scrap Recovery", addressing The Advertising Council, 25 West 45th Street, New York.

NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

STEEL

The Weekly Magazine of Metalworking



WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.54	7.21	8.55	7.05	..	6.62	7.53	9.28	6.37	6.71	7.98
JerseyCity(c'try)	6.24	6.91	8.25	6.75	....	6.32	7.23	8.98	6.07	6.41	7.68
Boston (city) ..	6.40	7.18	8.63	6.35	...	6.25	7.04	9.00	6.40	6.86	7.84
Boston (c'try).	6.20	6.98	8.43	6.15	...	6.05	6.84	9.20	6.20	6.66	7.64
Phila. (city) ..	6.97	7.05	8.38	6.33	7.11	6.30	7.16	8.92	7.84	6.34	7.40
Phila. (c'try)..	6.72	6.80	8.13	6.08	6.86	6.05	6.91	8.97	7.59	6.09	7.15
Balt. (city) ...	6.22	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try) ..	6.02	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va. ..	6.78	....	....	....	....	6.00	7.20	...	6.30	6.30	7.15
Richmond, Va..	5.95	6.57	8.10	6.14	...	5.91	6.59	...	6.22	6.86	7.47
Wash. (w'hse).	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.06	6.22	7.86
Buffalo (del.)..	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45§§§	5.80	6.05	7.35
Pitts. (w'hse)..	5.50	6.63	7.85	5.59	6.90	5.45	6.15	10.30††	5.65	5.65	6.89
Detroit (w'hse)	5.79	6.47	7.99	5.76	7.15	6.14	6.89	9.13	6.32	5.88	7.41
Cleveland (del.)	5.74	6.52	8.16	5.85	7.18	5.77	6.60	8.91	6.15	6.15	7.39
Cleve. (w'hse).	5.54	6.32	7.96	5.65	6.98	5.57	6.40	8.71	5.95	5.95	7.19
Cincin. (city)..	5.99**	6.53	8.44	6.15	...	5.99	6.79	...	6.24	6.29	7.43
Chicago (city).	5.76	6.55	8.08	5.77	...	5.67	6.50	10.50††	5.88	5.90	7.09
Chicago (w'hse)	5.56	6.35	7.88	5.57	...	5.47	6.30	10.30††	5.68	5.70	6.89
Milwau. (city).	5.90	6.76	8.21	5.85	...	5.83	6.76	10.85††	6.01	6.06	7.25
Milwau. (c'try)	5.70	6.56	8.01	5.65	...	5.63	6.56	10.65††	5.81	5.86	7.05
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.85	6.23	6.33	7.53
St. L. (w'hse).	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse).	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
Seattle-Tacoma.	7.04	8.96	9.65	7.04	....	6.70	9.00	10.35	6.54	6.78	8.73
San Francisco..	7.05	8.60‡	9.20‡	7.30	....	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ‡—500 to 1499 lb; §—450 to 1499 lb; §§—3500 lb and over; §§§—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	32.00
Rhodesian	
45% no ratio	20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60, Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton, Chewelah, Wash., Luning, Nev. Domestic dead-burned, ¾" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Clay Center, Woodville, Gibsonburg, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13; Nario and Bettsville, O., $13.75.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For current quotations on manganese, titanium and "other" ferroalloys, see page 155, Dec. 17 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 95 Dec. 24 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Dec. 27	$43.00
Dec. 20	43.00
Nov. 1951	43.00
Dec. 1950	45.50
Dec. 1946	27.69

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1 — Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Uncut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turning	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+ 10.00
29. Shafting	+ 10.00
30. Hard Steel cut 2 ft & under	+ 3.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively. (2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10. (3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth. (4) Premiums for Grades 11-18, 20 and 21 may be charged only upon OPS authorization or when sold for use in electric and open-hearth furnaces or foundries. (5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose. (6) Prices for Grade 30 may be charged only when sold upon OPS authorization to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering. (2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12. (3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy melting Steel	— $2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches,	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses, otherwise ceiling shall not exceed that for Grade 14. (2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel. (3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast. (2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be celing price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in 6-in. size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c; Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c; Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (Including Chester, Pa., 75c; Cleveland, 76c; Coatesville, Pa., 50c; Conshohocken, Pa., 20c; Detroit, 95c; Duluth, Minn., 50c; Harrisburg, Pa., 51c; Houston, 57c; Johnstown, Pa., 75c; Kansas City, Mo., 78c; Kokomo, Ind., 51c; Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c; Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 32c; Portsmouth, O., 51c; St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 58c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c; Warren, Pa., 75c; Weirton, 70c; Youngstown, 75c.

HAMILTON, ONT.
(Delivered Prices)

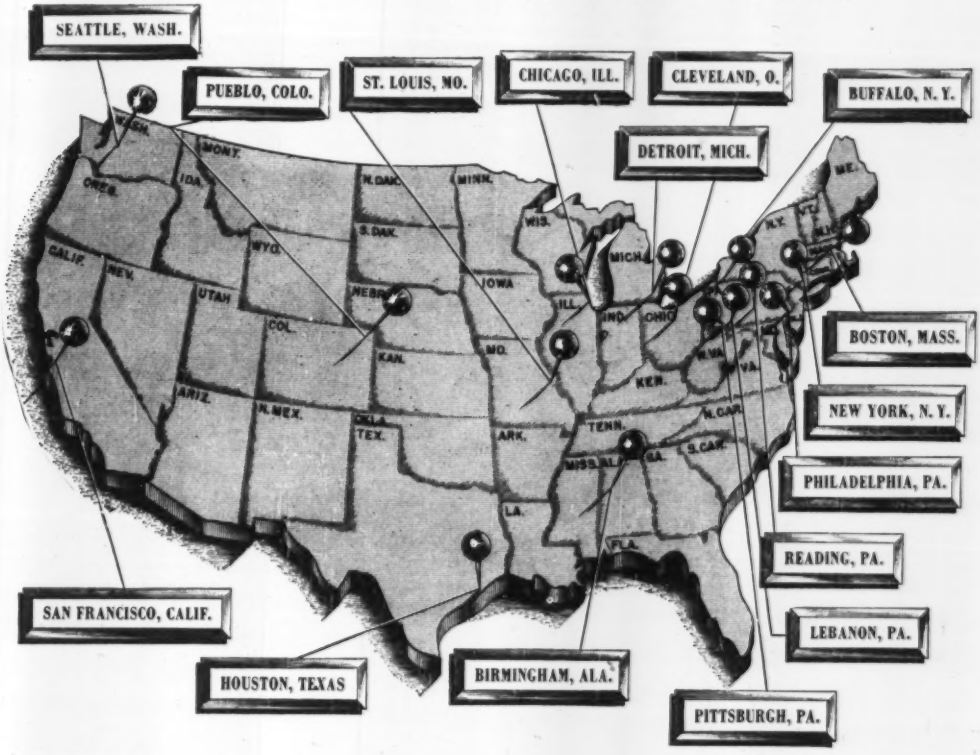
Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Boring, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd	33.00
Unprep'd	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.

For the Purchase or Sale of

Iron and Steel Scrap . . .

CONSULT OUR NEAREST OFFICE



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"... helping to keep the business cycle on an even keel ..."

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"The employees of Pittsburgh Plate Glass Company since 1946, have purchased $9,488,510 in United States Savings Bonds through the Payroll Savings Plan. This accumulation of assets will be of inestimable value in helping to keep the business cycle on an even keel by maintaining purchasing power for the future."

Payroll Savings—the plan that protects—pays the employer *triple* benefits:

- it makes a good employee a better one—a serious saver with a definite plan for personal security.
- as enrollment on the plan goes to 60%, 70% employee participation, productivity increases, absenteeism decreases and accident records go down.
- and as Mr. Higgins points out, the systematic purchase of Defense Bonds through the Payroll Savings Plan is building a tremendous reserve of purchasing power.

Let's point up the third employer benefit with a few figures:

- On September 30, 1951, individuals held Series E Bonds totaling $34.6 Billion—more than $4.6 greater than on V-J Day.
- During the five calendar years (1946-1950) Defense Bonds sales provided:

—*Cash* to retire $3 Billion A-D Savings Bonds (maturing Series).

—*Cash* to meet $24 Billion redemptions of E, F and G Bonds.

—$6 Billion (after providing cash for the payments enumerated above) that the U.S. Treasury could use to pay off bank-held debt.

And the figures are getting better every day—between January 1, 1951 and November 1, 1951, 1,200,000 employed men and women joined the Payroll Savings Plan.

If the employee participation on your Payroll Savings Plan is less than 60%, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D.C. Your State Director will be glad to show you how you can participate in the triple benefits of the Payroll Savings Plan.

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STEEL
The Weekly Magazine of Metalworking

The Metal Market

Copper, lead and zinc supply outlook improves as International Materials Conference and NPA allocate larger tonnages for delivery early in 1952

LARGER tonnages of copper, lead and zinc will be available to domestic consumers in the first quarter of 1952. Allocations to this country of the free world's supply of copper and zinc have been increased for the first quarter of next year over the last three months of 1951.

The Copper-Lead-Zinc Committee, International Materials Conference, said the United States will get about 10 per cent more copper and just a bit more zinc in the first quarter. The conference divides the supply of scarce materials among member nations.

The United States will get 366,000 metric tons of copper and 229,000 tons of zinc.

National Production Authority is issuing January allocations of domestic lead and zinc, and present indications are fabricators of these metals will receive bigger allocations than for some months past. Trade reports indicate lead tonnages will total between 40,000 and 42,000 tons from domestic sources. This would include substantial amounts drawn from the 30,000 tons of lead authorized for release from the government's stockpile in November. The January allocations would compare with about 30,000 tons of domestic lead, including about 10,000 tons of stockpile metal allocation for delivery in December.

Imports May Rise—Domestic consumers may be able to obtain larger supplies of foreign lead in the near future. Buying pressure on foreign lead markets has diminished, causing a decline in prices. The British bought Mexican lead for second quarter delivery at 19.00c a pound, or 2.50 cents a pound below the previously prevailing price. Spot lead has eased ½-cent a pound to the equivalent of 21.00c Gulf of Mexico ports. A few sales were reported at this level, but demand has slowed considerably.

Consumers in this country are hopeful that the easier price trend abroad will bring the foreign lead quotation down to the 19-cent New York ceiling price so they can increase imports. This may develop early in the new year.

Mine production of recoverable zinc in the United States in October increased to 60,004 tons, or 20 per cent greater than the September output, reports the Bureau of Mines. The average daily production rate was 1936 tons compared with 1670 tons in September and 1708 tons per day in 1950.

Mines in the states east of the Mississippi river produced 17,249 tons of recoverable zinc, or 29 per cent of the country's total. This represented a 21 per cent increase over production in September. The states of Arkansas, Kansas, Missouri and Oklahoma also reported a larger tonnage, increasing from 7593 to 8510 tons. The western states produced 34,245 tons of zinc, or 57 per cent the domestic mine yield in October.

Revere Expands in West

Continuing a program of expansion in aluminum fabrication, Revere Copper & Brass Inc., New York, will extend aluminum operations to the Pacific Coast as rapidly as feasible, by approximately doubling the size of its present Los Angeles plant which currently is fabricating only copper and copper alloys.

James J. Russell, chairman of the board, says a target date of the spring of 1953 has been set for operation of the addition to the Los Angeles plant which will produce aluminum tube and extruded shapes in a variety of alloys, both heat-treated and non-heat-treated. Wallace M. Hitchcock is manager of Revere's Pacific Coast Division.

The company's aluminum operations are also being expanded at Baltimore where a 3000-ton extrusion press and added tube-drawing facilities are being installed. The Baltimore program is nearing completion and is expected to be operating within 120 days. The new facilities will approximately double the plant capacity for drawn aluminum tube and extruded shapes.

Revere installed before the Korean outbreak new aluminum rolling and annealing facilities at the Canton plant in Baltimore, the output of which would triple previous production of coiled sheet.

The Revere plant in Detroit also was equipped for the production of aluminum coiled sheet, machinery having been installed before the Korean outbreak. This equipment has had only limited operations on aluminum because of the metal shortage.

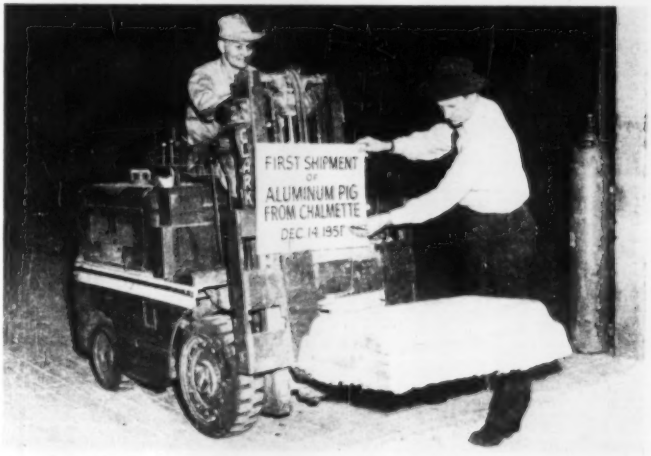
The Aluminum Division at Baltimore under the direction of I. T. Bennett, vice president, will continue to maintain general supervision over the aluminum activities in all divisions of Revere. The present installed capacity makes Revere the largest independent fabricator of aluminum in the United States.

Noranda May Build Smelter

A new smelter, proposed for the Gaspe area, Canada, by Noranda Mines Ltd., would handle 75 tons of copper per day, Premier Maurice Duplessis told the legislature at Quebec. The Premier said he had been informed that 15 million additional tons of copper ore have been found near the deposit of 60 million tons previously discovered in Gaspe.

Northwest Power Supply Rises

Favorable weather conditions in the Pacific Northwest have eased the power situation, removing the threat of a brownout. John Davis, deputy administrator of Defense Electric Power Administration, says the agency expects to dissolve its regional organization Dec. 31, "assuming the water situation is as good as it is expected to be."



ONLY PART OF IT: This is only a portion of the first shipment of aluminum pig from Kaiser Aluminum & Chemical Corp.'s new Chalmette reduction plant at New Orleans. Three days after the first aluminum was poured at the plant, aluminum pig began rolling by rail to Kaiser's aluminum extrusion plant at Halethorpe, Md., to be used in aircraft extrusions

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.5%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $212-$215 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.50 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.35 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 26, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.62; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.2%; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 160,000 lb lots 28.54⅝; 30,000 lb lots 28.67; l.c.l. 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l. 31.10. Magnet wire, del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	....	....
0.135-0.096	12-48	30.6	....	....
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R-317-T4	——Hexagonal——	17S-T4
0.125	52.0	....	....	
0.156-0.0188	44.0	....	....	
0.219-0.313	41.5	....	....	
0.375	40.0	46.0	48.0	
0.406	40.0	....	....	
0.438	40.0	46.0	48.0	
0.469	40.0	....	....	
0.500	40.0	46.0	48.0	
0.531	40.0	....	....	
0.563	40.0	....	45.0	
0.594	40.0	....	....	
0.625	40.0	43.5	45.0	
0.688	40.0	....	45.0	
0.750-1.000	39.0	41.0	42.5	
1.063	39.0	....	41.0	
1.125-1.500	37.5	39.5	41.0	
1.563	37.0	....	....	
1.625	36.5	....	39.5	
1.688-2.000	36.5	....	....	

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets, 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval, 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c; 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	19.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; unlined brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 1-27	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 21-30	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 1-20	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Sheets, Strip . . .

Sheet and Strip Prices, Page 83 & 84

Boston—With more strip mill capacity diverted to plate production, allocations of hot-rolled tonnage to cold strip converters are filled with increasing difficulty. Demand for narrow cold strip is off, however, notably civilian requirements. Defense needs are mounting gradually, but in general do not balance the decline in demand from other directions.

Cleveland—Although the mills are sold out for first quarter, sheetmakers generally anticipate steady easing in pressure for tonnage over coming months. Predictions are heard of much more satisfactory supply conditions in the light, flat-rolled products by midyear.

Pittsburgh—With recent easing in demand for hot and cold-rolled sheets, mills see a ray of hope that by mid-1952 supply will be adequate to meet demand.

Steel Bars . . .

Bar Prices, Page 83

Cleveland—Pressure on the bar mills is unrelieved. They will enter first quarter with substantial carryover tonnage. Order books are filled for first quarter and it is reported CMP tickets for the period are being turned away.

Pittsburgh—while some of the larger bars seem in better supply, most sizes are tight in this area. Many inquiries for forging bars are being received. Much of the pressure is due to military and defense orders.

Pig Iron . . .

Pig Iron Prices, Page 82

Boston—Iron foundries will need more defense work in 1952 if near-capacity operations are to be attained; metalworking contracts placed in New England to date required steel largely with iron casting needs small.

Cleveland—Holiday lull took some of the pressure off merchant iron sellers. However, expanding foundry operations are anticipated after the holidays as more castings shops get into defense work. This means short pig iron supplies will have to be stretched further.

Pittsburgh—Production in this district remains high with all blast furnaces operating—excepting U. S. Steel's No. 4 stack at Edgar Thompson Works which is down for repairs.

Warehouse . . .

Warehouse Prices, Page 89

Chicago—Recalculation of steel warehouse prices under CPR 98 reveals adjustments range from an increase of 40 cents per ton to reductions of $2.20 a ton in the standard range of carbon products. The increase is for hot-rolled strip. Decreases are: hot-rolled sheets, 80 cents; cold-rolled sheets, $1; galvanized sheets, $1.40; hot-rolled bars, $1.60; shapes, 40 cents; plates, $2; and floor plates, $2.20. Cold finished bars are unchanged.

For Milwaukee the pattern is somewhat different. Increases are: Cold-

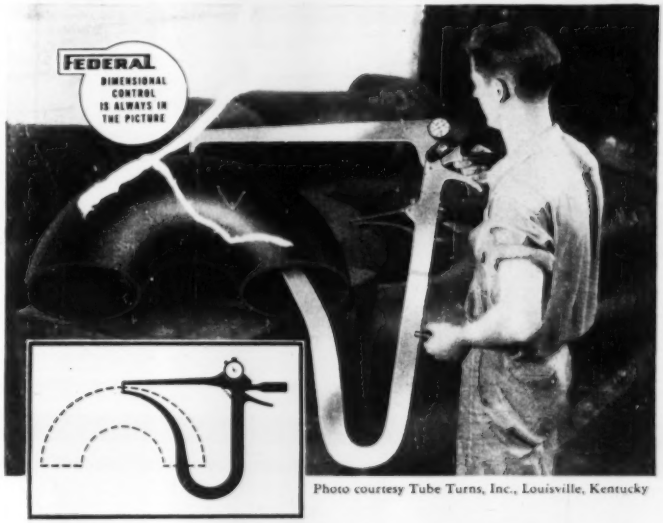


Photo courtesy Tube Turns, Inc., Louisville, Kentucky

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rolled sheets and cold-finished bars 40 cents; galvanized sheets $2.40. Reductions are: Hot-rolled sheets and hot-rolled strip, 80 cents; hot rolled bars, $1.20; shapes, 60 cents; plates, $1.60; and floor plates, $1.80.

Baltimore—At least six varying warehouse price lists prevail in the Baltimore area under price regulation CPR-98 with the 20 cents per 100 pounds differential between city and country delivery prevailing. Slight rollbacks result on most standard products based on Pittsburgh shipments, exceptions being hot-rolled sheets, carbon plates and galvanized sheets. Plates go to 6.13c from 5.80c and hot-rolled sheets, No. 18 gage and heavier, to 6.02c from 5.60c, country prices.

Pittsburgh—Warehouses could be sky-rocketed into the steel limelight if current steel wage negotiations bog-down and a strike materializes. They would be under heavy pressure for tonnage.

Boston—While slight spreads in warehouse prices would normally be ironed out to competitive levels, current demand and limited supply of some products points toward some variances. Plates, including floor, and cold-rolled sheets are rolled back slightly.

Wire . . .

Wire Prices, Page 85

Boston—Carbon steel for precision spring wire allotments for first quarter are reduced to approximately 50 per cent of base period tonnage which is slightly in excess of 37,000 tons.

Scrap . . .

Scrap Prices, Page 90

Detroit—View in the scrap trade here is that the mills will not be too averse to a strike. No arrangements seem to have been made for laying down scrap in event of a work stoppage. Mills are unable to add to scrap stocks. Buyers are said to be increasingly critical of quality. Change in CPR 5 last week had some traders confused but generally the feeling prevails the $5 premium on grade 30 was too high.

Pittsburgh—The scrap supply picture is not improving materially in this area. Some mills are in a better position than a few weeks ago but others are extremely short of scrap. Most scrap drives have not been too successful in the district although everybody is concerned over the problem and searching every possible place for discarded material.

Boston—Scrap from automobile wrecking is reaching yards in heavier volume and will boost December intake somewhat. While allocations against dealers are lower, steel scrap shipments continue in substantial volume. Cast grades are spotty, but buying is generally at ceilings.

Products Reclassified

Washington—National Production Authority last week announced ten class B steel products have been reclassified as controlled materials beginning first quarter.

The products, formerly included in six product codes in the official CMP Class B Product List, now come under complete allocation like all basic steel, copper and aluminum materials under the Controlled Materials Plan.

The move was taken because of the general tightness in the supply of steel products.

The ten reclassified products are: Die blocks; roofing, galvanized, corrugated, V-crimp and channel drain; siding, corrugated and brick; ridge roll, valley and flashing; nails, bright steel wire, steel cut, galvanized, cement-coated and painted; spikes and brads, steel wire, galvanized and cement-coated; staples, fencing and poultry; wire rope and strand; woven wire netting; welded wire mesh.

Structural Shapes . . .

Structural Shape Prices, Page 83

Boston—Contracts for fabricated structural steel, 100 tons or more, placed in New England in 1951 approximate 87,000 tons, slightly higher than the total for 1950. Contributing heavily were requirements for the Arterial highway, Boston.

Plates . . .

Plate Prices, Page 83

Seattle—Plates continue exceedingly scarce and imported Japanese steel is easily absorbed above domestic prices.

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Metalworking Briefs. . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Colonial Boosts Production

An addition to Colonial Broach Co.'s factory at 21601 Hoover Rd., Detroit, has just been completed. The addition, which increases machine construction plant area 30 per cent, houses expanded machine shipping, painting and assembly facilities. To further increase machine tool production capacity for broaching machines and hydraulic presses, a large horizontal boring mill, a large planer and other heavy-duty grinding and machining equipment, as well as a 20-ton crane, have been installed.

Convair Leases More Space

Convair Guided Missile Division, Pomona, Calif., Consolidated Vultee Aircraft Corp., leased 79,000 square feet of building space at the Los Angeles county fairgrounds, Pomona, for engineering, experimental shop and laboratory facilities. Convair Guided Missile Division's plant, under construction in Pomona, is scheduled for completion by Aug. 1.

Forms Foreign Subsidiary

Cincinnati Milling Machine Co., Cincinnati, formed a company in the Netherlands to be known as Cincinnati Milling & Grinding, N.V. A site for a plant is being sought in Vlaardingen, near Rotterdam, plans calling for a factory to produce part of the machine tool line, assemblies to include some parts and units fabricated in Cincinnati.

Danly Machine Buys Building

Danly Machine Specialties Inc., Cicero, Ill., purchased for $495,000 a building at 1942 S. 52nd St., that city. The building contains 57,000 square feet of floor space.

Precision Shot Co. Expands

Precision Shot Co., Birmingham, Mich., completed expansion of facilities for its new Shot Peening Division. This division operates for industry as a pilot and contract production shot peening shop. The company offers experimental facilities and consultation service to firms wishing to investigate the shot peening process.

Metalworking Plant Opens

Henry & Miller Industries Inc., New York, opened a new metal fabrication and finishing plant in Jersey City, N. J. The plant will be in full-scale operation early in January. The firm manufactures machine tools, radar and television parts, bomb fuses, and numerous other precision items, as well as anodizing and plating for military use.

Fastener Maker Expanding

Russell, Burdsall & Ward Bolt & Nut Co., New York, is enlarging facilities for manufacturing bolts, nuts and screws at 4466 Worth St., Los Angeles.

Tool Maker Cited for Safety

Scully-Jones & Co., Chicago, manufacturer of standard and special production tools, was honored for an outstanding safety record—three years without a disabling accident or an accident that caused the loss of a single day's work. The firms employees worked a total of 1,334,325 manhours without a lost-time accident.

Maltby Constructing Plant

Edward B. Maltby Inc., Los Angeles, is constructing a plant for manufacture of bearings, chains and power transmissions at 52nd street near Gifford avenue, Maywood, Calif.

Star Machinery To Build

Star Machinery Co., Seattle, plans an office and warehouse building at 221 Lander St., that city. The new unit awaits approval by National Production Administration and will include offices, display and machinery storage. The firm will continue its present offices and warehouse at 1741 First Ave., S.

Warner Buys Machinery Firm

Warner Steel Products Co. Inc., Ottawa, Kans., purchased the Insul-Wool Machinery Mfg. Co., Wichita, Kans. Sale includes the entire manufacturing rights, facilities, tooling and inventory. The Warner firm manufactures tractors, power saws, post hole diggers and similar products. Robert D. McCarthy is president of Warner Steel Products.

Welding Students Aided

Two fellowships in metallurgy, each with an annual value of $3500, are available at Rensselaer Polytechnic Institute, Troy, N. Y., for graduate students who wish to pursue advanced work in seams and spot welding. The fellowships were established by Welding Research Council, New York, and are

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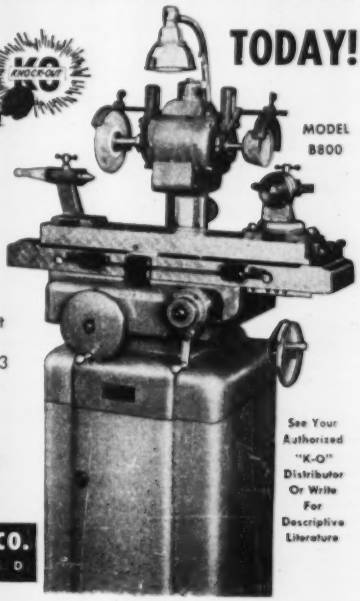

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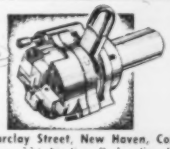

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to be awarded through Dr. Ernest F. Nippes who directs welding research at the Institute.

Ryerson Expands on Coast

Effective Dec. 17, Joseph T. Ryerson & Son Inc. took over the Seattle plant and business of Seattle Steel Co. and that company's subsidiary, Inland Empire Steel Co., Spokane.

Interstate Completes Plant

New office and warehouse quarters for Interstate Steel Co. at 2100 Greenwood, Evanston, Ill., were completed. The new plant, costing in excess of $250,000, contains 30,000 square feet of space.

Hills-McCanna Co. Expands

Hills-McCanna Co., Chicago, acquired a substantial financial interest in Air Conversion Research Corp., also of Chicago, maker of equipment used extensively for compressed air applications.

Struthers Improves Machine

A roller table bending machine, capable of cold stretch-forming a variety of structurals and sheet metal parts which conventionally are hot-formed, is a new development of the Machinery Division, Struthers Wells Corp., Titusville, Pa. It will stretch-form metal up to $2\frac{1}{2}$-square-inch area.

McGraw Electric Buys Firm

McGraw Electric Co., Elgin, Ill., acquired Jeffrey-DeWitt Insulator Corp., Kenova, W. Va., the principal supplier of McGraw's subsidiary, Line Material Co. which has received a contract in excess of $250,000 from the Army to manufacture barrels for the Garand rifle at its Birmingham plant.

Southeastern Metals Builds

Southeastern Metals Co., Birmingham, will start work soon on a $400,000 addition to its metal tube plant for chrome plating of tubing and other materials, largely for the metal furniture trade. Robert T. Harris is president of the company.

New Jersey Firms To Merge

Stockholders of Elastic Stop Nut Corp. of America, Union, N. J., and American Gas Accumulator Co., Elizabeth, N. J., will consider and act upon early in February a proposed merger of the companies. Elastic manufactures self-locking nuts and nails and a hollow, split, cylindrically formed fastener. AGA makes aviation ground lighting equipment, aids to marine navigation, time-delay relays, traffic reflector signs and signals.

PRELUDE TO STEEL: Workmen build a temporary railroad on which cranes will move to position structural steel for a new open-hearth furnace building of Republic Steel Corp. in Cleveland. Approximately 17,000 tons of structural steel will be used in the building which will house four open-hearths

Voi-Shan Building Plant

Voi-Shan Mfg. Co. Inc., Los Angeles, is constructing a plant adjacent to the existing one at 8463 Higuera St., Culver City, Calif., to increase production of aircraft components.

Plans $32 Million Plant

National Petro-Chemicals Corp. is building a plant near Tuscola, Ill. The company was organized last June by National Distillers Products Corp., New York, and Panhandle Eastern Pipe Line Co. on a 60-40 per cent participation basis. John E. Bierwirth is president of the new corporation. The plant, to cost about $32 million, is being built primarily for recovery of ethane from natural gas.

Shelley Buys Klemp Firm

Shelley Steel Corp. purchased the William F. Klemp Co., steel gratings manufacturer, both of Chicago. The Klemp facilities will be expanded through construction of a third manufacturing unit with an area of 50,000 square feet of floor space.

Duradec Inc. Organized

Youngstown Mfg. Inc., Youngstown, is dropping the manufacture and sale of Duradec, a heat-resisting plastic widely used for sink and table tops. A new com-

pany, Duradec Inc., was organized to take over that part of the business. Youngstown Mfg. had developed the material as a side line to its aluminum and stainless steel trim business. Duradec will take over a plant which Youngstown Mfg. had used for making that patented product, but Youngstown keeps its two other plants.

Ship Construction Proceeds

Canadian Vickers Ltd. started construction in Montreal on two more cargo ships for Flota Mercanta Grand Colombia, a Colombian shipping firm. The order for six such ships was placed in 1948 at a cost of $5 million. Two have been completed.

Electronics Plant Opened

A new plant building of Stromberg-Carlson Co., Rochester, N. Y., was formally dedicated. President Robert C. Tait said millions of dollars worth of defense products will come off the production lines of the company's Sound Division during the coming year. He reported that production of electronic equipment has been tripled during the past year and will be tripled again in 1952.

Hewitt-Robins Moves Branch

Philadelphia office and warehouse of Hewitt-Robins Inc., New York, is moving Jan. 1 from its present location at 401 N. Broad St., to Coral and Hagert streets, Philadelphia 25. The new quarters also serve as office and warehouse for the Hewitt Rubber and Robins Conveyors divisions of the company.

Rectifier Maker Expanding

International Rectifier Corp. purchased a factory building at 1521 E. Grand Ave., El Segundo, Calif. The company's former plant at 6809 S. Victoria Ave., Los Angeles, is being maintained for research and development.

Science Fellowships Offered

Between 20 and 40 fellowships, valued at $250 each, will be awarded to secondary school science teachers who will participate in a special six weeks' summer program at Carnegie Institute of Technology, Pittsburgh. They were made available by the Westinghouse Educational Foundation which is maintained by Westinghouse Electric Corp., Pittsburgh.

Guggenheim Forms New Firm

Guggenheim Bros., New York, organized a new firm to carry on the family's interest in mining and metallurgy and to conduct research and new business. Harry F. Guggenheim heads the firm. Other members are: Horace R. Graham, president, Anglo-Lautaro Nitrate Corp.; Albert E. Thiele, chairman, Pacific Tin Consolidated Corp.; James F. Boetsch, president, Chilean Nitrate Sales Corp., Chilean Nitrate Educational Bureau and Chilean Iodine Educational Bureau; R. Paul Miller, vice president, Anglo-Chilean Nitrate and Lautaro Nitrate companies; Albert D. Van de Maele, partner in the law firm of Guggenheim Bros. and president, American International Trade & Service Co.

HIGH LIFT: A 25-ton Lorain crane wheels into position to erect steel at the new Budd Manufacturing Co. plant in Philadelphia. The crane, owned by Belmont Iron Works of Philadelphia, has a 60 foot boom plus a 30 foot jib to give it extra high lift

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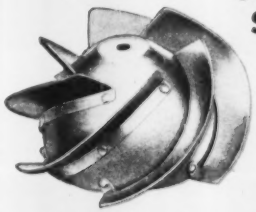
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King 42" Vertical Boring Mill, 2 heads.
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Cincinnati 2-24 Plain Automatic Miller.
Cincinnati 36" Shaper Planer, late.
Landis 10X18 Plain Grinder, late type.

LeBlond #2½ Univ. Miller, 3 SCD.
Gould & Eberhardt 96 H Hobber.
Brown & Sharpe #10 Tool & Cutter Grinder.
Aurora 24" Upright Drill, #4MT, tapping.
Defiance #3 Upright Drill, #5MT.
Sellers 4T Tool Grinder, motor drive.
Sellers 6T Tool Grinder, late type.
Landis #2 Universal Grinder, cone drive.
Landis 16 x 72 Plain Cylindrical Grinder.
Brown & Sharpe #12 Plain Grinder, reversing mechanism.
Micro Internal Grinder, Model F.G.
Heald #70A Internal Grinder.
Heald #78 Centerless Internal & Cylindrical Grinder, late type, complete.
Landis #6 Precision Thread Grinder, New 1944.
Nazel 6N Pneumatic Power Forging Hammer.
Cincinnati 24 x 24 x 6' Double Housing.
Cleveland 26 x 26 x 8' Openside Planer.
Universal 24" Openside Shaper Planer.
Lodge & Shipley 16" x 6', single pulley drive, 12 spindle speeds.
American 16" x 8', 3 SCD, 56" center distance, 1¼" hole in spindle.
Blount Model B-3 Special Application Lathe for Turning, 20" swing, 2½" hole in spindle, 54" centers.
Lodge & Shipley 20 x 8, single pulley drive, 12 spindle speeds.
Bradford 20" x 18', 4 SCD, 12' center distance, Loose change.
American 30" x 26' centers, 12 speed head, 2 9/16" hole in spindle.
American 36" x 32' center distance, 2⅝" hole in spindle, first class.
American 48" x 10' centers, 2⅝" hole in spindle, first class.
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Monarch 16"X10' bed GH Lathe, 8 spindle speeds, 1⅞" hole in spindle.
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LeBlond 21"x10' bed, 3 SCD, 5'2" centers.
Heald 47A Borematic, 3 heads, late type.
Cincinnati 1-18 Plain Automatic Miller.
Ohio #3 Plain Miller, rectangular overarm.
Heald 72A3 Internal Grinder, new 1935.
Oliver 510 Drill Grinder.
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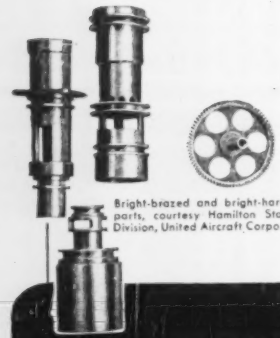

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Driving a Goodman belt conveyor, this Speedaire unit, only 26" high, clears the ceiling with room to spare. As indicated by the white outline, the standard reducer required to do this work is of much greater frame size.

SPEEDAIRE conveyor drives save $4316

ALL haulage at the Peters Creek mines, underground and above, is by belt conveyors driven by Speedaires. By installing this powerful fan-cooled drive instead of a conventional worm-gear speed reducer, the coal company saved three ways:

1. *Weight saving*—700 pounds per unit—an important consideration on mining equipment.
2. *Space saving*—Speedaire is 11" lower, 6½" shorter and 4" narrower, permitting use in thinner seams.
3. *Cost savings*—Speedaire averaged $616 less than a standard unit of comparable capacity. On 7 drives installed on conveyors below and above ground, the saving was $4316.

Cleveland Worm Gear Speed Reducers have been serving the coal industry for more than a quarter century, operating conveyors, shuttle cars, hoists, picking tables, separators, elevators, jigs, shakers, dryers, loaders and other equipment —wherever a powerful, trouble-free, right-angle drive is desired. Wherever they serve, coal men know from experience that they can depend on Clevelands for satisfactory, continuous service, no matter how severe the conditions.

Write for the new Cleveland catalog. The Cleveland Worm and Gear Company, 3270 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

Choice of the Leaders

CUTLER-HAMMER
MOTOR CONTROL
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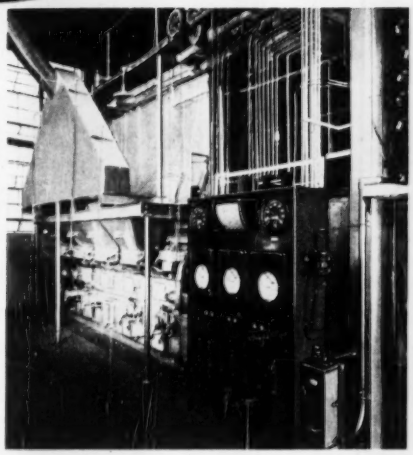
The Mark of Better Machines

CLEARING MACHINE CORPORATION DRAW PRESS 100% EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL



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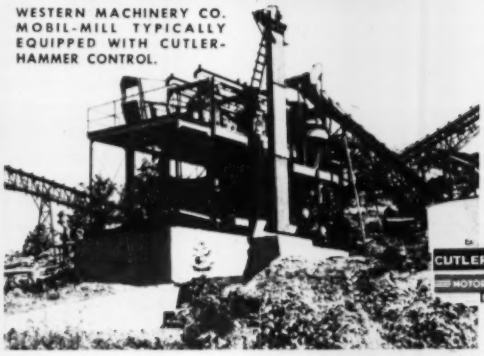
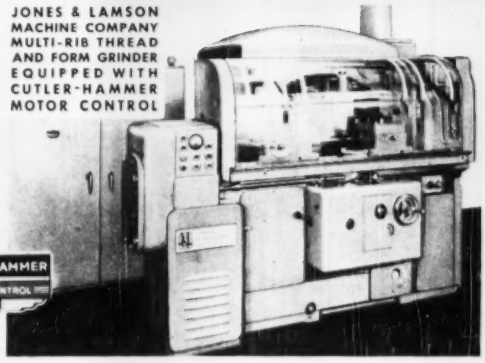


JONES & LAMSON MACHINE COMPANY MULTI-RIB THREAD AND FORM GRINDER EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL



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There is no such thing as a *bad* product of any kind on the American market; competition is too severe for a poor product to exist. But there *are* degrees of merit. Some products are recognized as better than other products. And some few in every field are widely accepted as the *best*. Their makers are acknowledged leaders and their names have become buy-words for assured satisfaction. This position of commercial advantage is neither easily won nor held without a policy of scrupulous attention to every detail influencing product performance in the user's hands. In accepting this obvious fact no thinking person can fail to be moved by the force of the evidence that Cutler-Hammer Motor Control is so frequently and continuously the choice of the nation's leading machinery manufacturers. You too will find it pays to insist on Cutler-Hammer Motor Control . . . . . CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Limited, Toronto, Ontario.